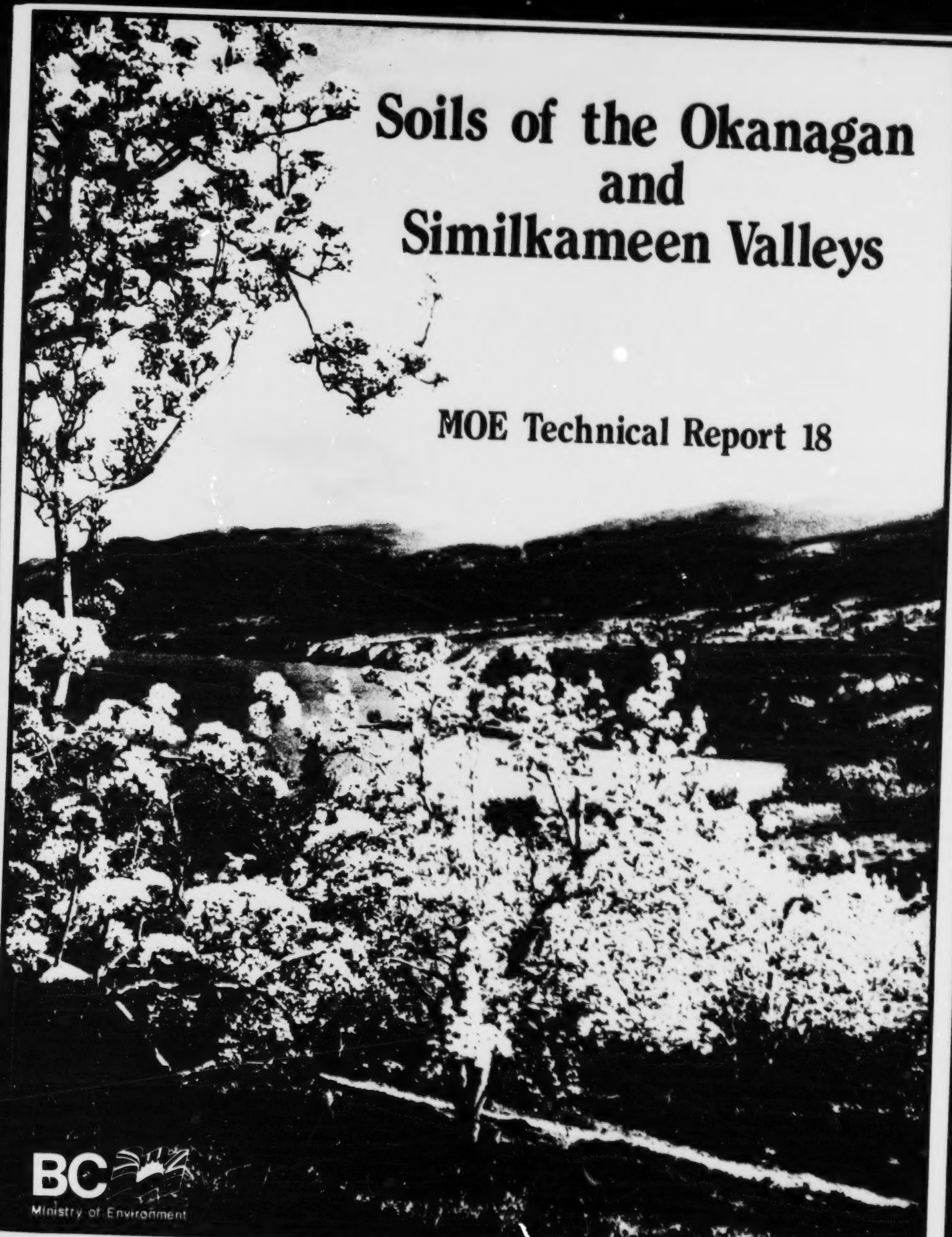
Soils of the Okanagan and Similkameen Valleys

MOE Technical Report 18



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MOE Technical Report 18

SOILS OF THE OKANAGAN AND SIMILKAMEEN VALLEYS

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British Columbia Soil Survey

U. Wittneben, P.Ag.

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INTRODUCTION

This publication describes the characteristics of the soils identified by a detailed (1:20 000) soil survey of the central and southern portions of the Okanagan Valley and the Lower Similkameen Valley. Included are the valley bottoms and lower valley slopes from Ellison Lake to the U.S.A. border in the Okanagan Valley, and from the Ashnola River to Nighthawk in the Similkameen Valley.

The initial soil survey for the Okanagan and Similkameen valleys was published by Kelly and Spilsbury in 1949 at a scale of 1 inch = 1.33 miles. This small scale survey was not designed to provide the detailed soil information needed for solving the complex present day land use problems. To meet these requirements, a resurvey at a larger scale (1:20 000) was initiated in 1971 and completed in 1981. It is intended to guide planners and land users in making decisions at the level of individual land parcels and farm units. For site-specific decisions more intensive investigations may be needed.

Fieldwork was conducted during the summers of 1971 to 1974 and 1979 to 1980. Soil mapping was carried out in accordance with the Canadian System of Soil Classification. A total of 24 soil maps at a scale of 1:20 000 were prepared and form an integral part of this report (see Figure 2). These maps are available from MAPS-B.C., British Columbia Ministry of Environment, Parliament Buildings, Victoria. Soil profile and laboratory data is stored in the British Columbia Soil Information System and is available from Surveys and Resource Mapping Branch, British Columbia Ministry of Environment, 553 Superior Street, Victoria.

HOW TO USE THE SOIL MAPS AND REPORT

Soil descriptions including general comments, landscape cross-sectional diagrams, landscape characteristics, photographs, typical profiles, and soil characteristics form the major part of this report. The map legend relates these soils to the maps which are published separately. Refer to Figure 2 for index of soil maps.

General information about the study area and its environmental characteristics is provided in Chapter One, while Chapter Two explains the procedures used in collecting the information used to compile the report and maps.

Chapter Three provides guidelines for soil descriptions and characteristics in Chapter Four while Chapter Four describes characteristics of all the soils identified in the map area.

Detailed soil profile descriptions for the map area are stored in the British Columbia Soil Information System (BCSIS) and are available at the following address.

Data Management Unit,
Surveys and Resource Mapping Branch,
British Columbia Ministry of Environment,
553 Superior Street,
Victoria, British Columbia.
V8V 1X5

Copies of the maps and report are available from:

MAPS-B.C.,
British Columbia Ministry of Environment,
553 Superior Street,
Victoria, British Columbia.
V8V 1X5

CHAPTER ONE
GENERAL DESCRIPTION OF THE MAP AREA

1.1 LOCATION AND AREAL EXTENT

The map area consists of the Okanagan and Similkameen valleys which are located in the extreme south central part of British Columbia. These valleys, incised into the Interior Plateau, are roughly 3 to 15 km wide and generally extend in a north-south direction. The map area is bounded on the south by the 49th parallel (International Boundary) and in the north by 50° N Latitude. The western boundary is 120° N Longitude.

1.2 PHYSIOGRAPHY AND DRAINAGE

The Okanagan and Similkameen valleys are deeply entrenched into the Interior Plateau (Okanagan Highland) and tributary streams flow from the plateau surface in narrow valleys on steep gradients. Okanagan, Vaseaux, Skaha and Osoyoos lakes are connected via the south flowing Okanagan River. The Similkameen River enters the map area from the west at 120° W longitude and flows generally south, parallel to the Okanagan valley. It joins the Okanagan River south of the Canada - U.S.A. border.

The valley bottom elevations range from about 270 m on Osoyoos Lake to about 340 m on Okanagan Lake. The Similkameen Valley, smaller than the main Okanagan Valley has steeper side slopes that rise to over 1100 m above sea level. A relatively level valley bottom is its' main feature south of Keremeos. Some low-lying bedrock ridges occur lengthwise in sporadic locales throughout the Okanagan Valley.

1.3 BEDROCK

Bedrock in the map area consists of various volcanic, intrusive, metamorphic and sedimentary rocks. East of the Okanagan Valley rocks of the Monashee group occur consisting mainly of layered gneiss, minor schists and quartzites. Some plutonic intrusions of granite, granodiorite and quartz diorite (Valhalla and Nelson Plutonic rocks) are also present. The western side of the valley is mainly characterized by plutonic rocks (granite, granodiorite and quartz diorite) while significant areas near Kaleden, Summerland, Westbank and Kelowna consist of andesite and trachite with minor conglomerate and basaltic flows. Bedrock in the Similkameen Valley area generally consists of greenstone, tuff, chert, minor diorite and quartzite (Kobau group; Old Tom formation).

1.4 CLIMATE

In contrast to the coastal area of British Columbia, the climate of the Okanagan and Similkameen valleys is very dry. It characteristically has hot, dry summers and crisp, largely overcast, after snow-free winters with air temperatures below freezing for about ten weeks. The region lies in the rain shadow of the Coast Mountains on which eastward moving moist Pacific air masses rise and loose their moisture. Cold arctic air occassionally intrudes into the valleys during the winter allowing temperatures to drop to about -25°C.

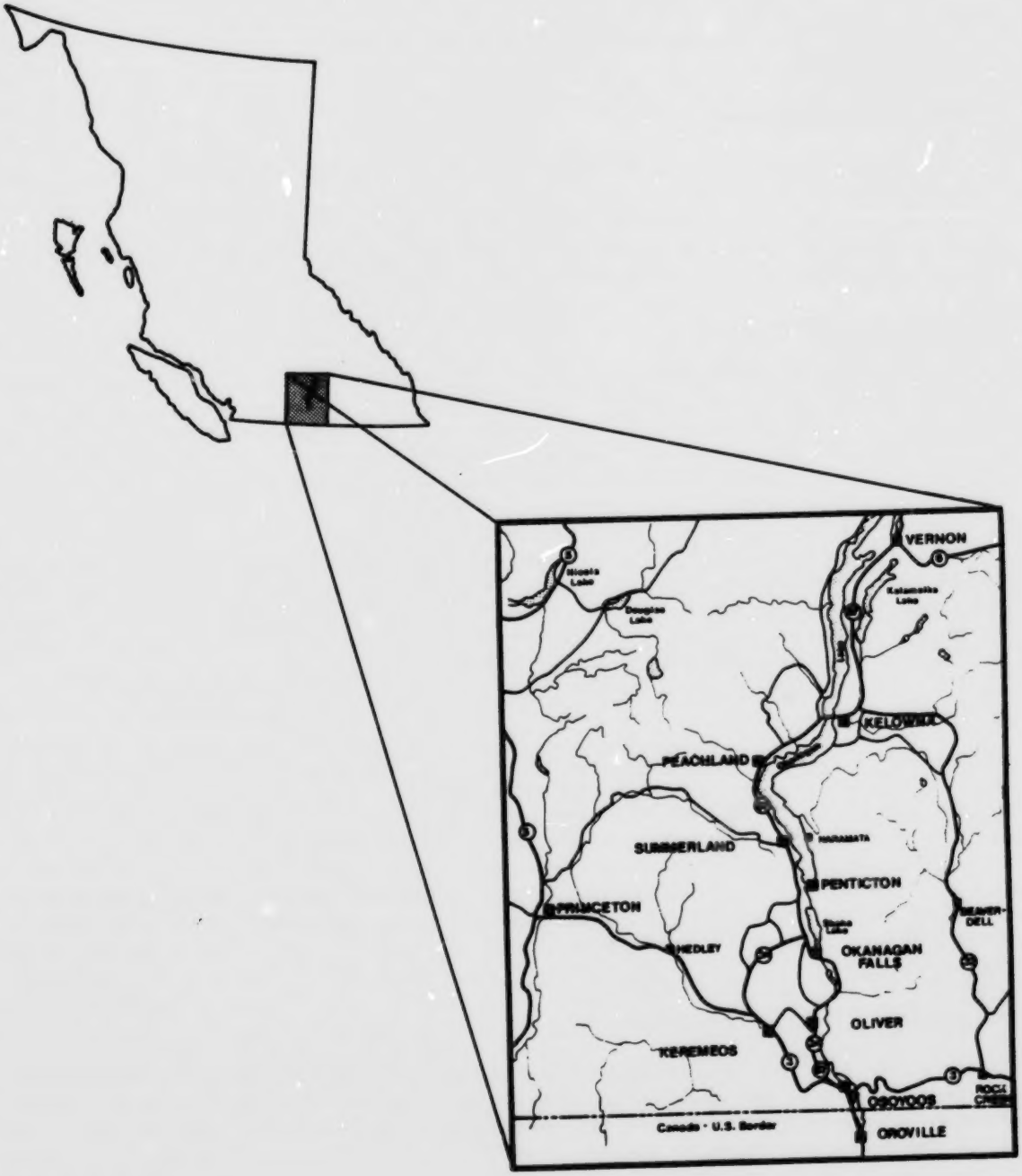


Figure 1. Location of the Okanagan - Similkameen Valleys Map Area.

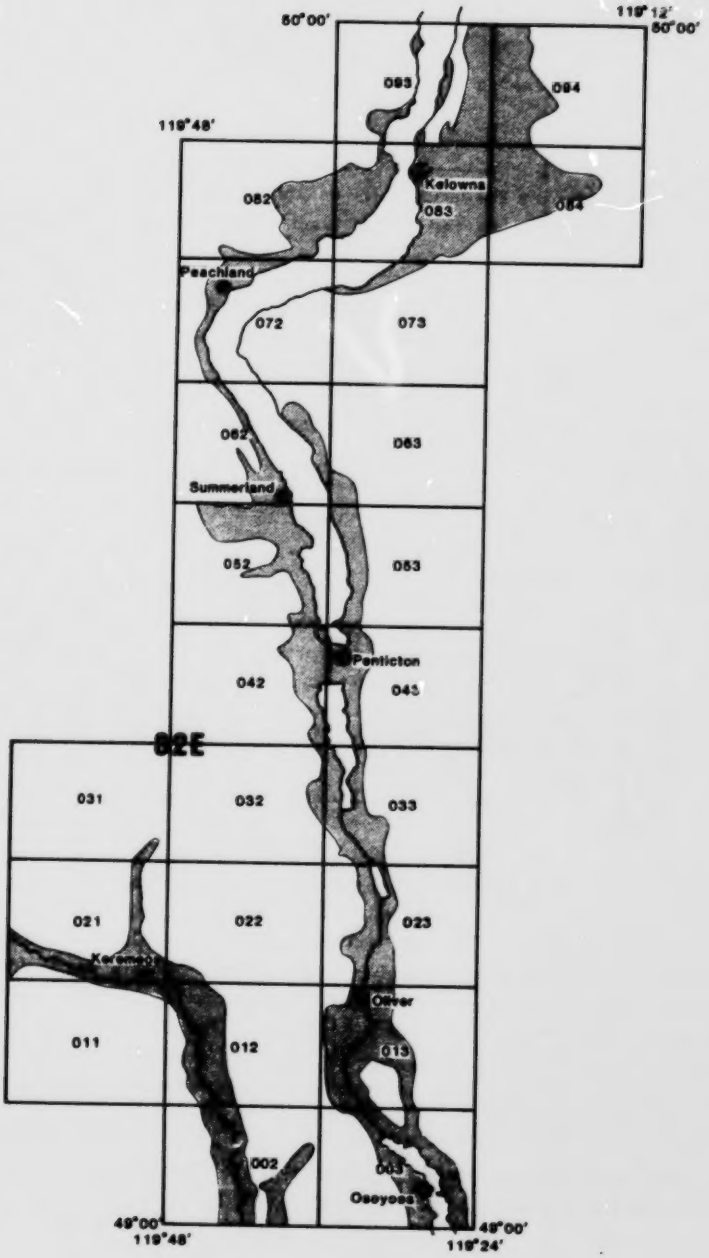


Figure 2. Index of soil maps for the Okanagan - Similkameen Map Area.

The dry, hot summers lead to soil moisture deficits during the growing season and irrigation is required for the production of most agricultural crops. Frost during the winter penetrates most soils to about 50 cm depth.

Data for representative climatic stations is presented in Appendix 1, 2 and 3.

1.5 VEGETATION

The map area lies within the Ponderosa pine - bunchgrass zone, the driest and warmest zone in British Columbia. The zone occupies the lowest position in the vertical sequence of zones common to the dry, interior valleys.

Characteristic species are bluebunch wheat grass, needle-and-thread, sand dropseed and rough fescue. Ponderosa pine with Douglas-fir are the most dominant tree species in the northern portion and occur discontinuously as open forest interspersed with grasslands. Sagebrush, rabbitbrush, low pussytoes and sometimes antelope bush become more prevalent in the southern section of the map area where they occur together with the grass vegetation.

Floodplains and other alluvial areas affected by water tables are characterized by black cottonwood, willow, red-osier dogwood, trembling aspen, alder, water birch and hawthorn.

1.6 SURFICIAL GEOLOGIC DEPOSITS

Several glacial advances and retreats together with glaciofluvial action have produced a variety of deposits and sediments that form most of the soil parent materials within the map area. Postglacial action by water, wind and gravity have modified some of the former materials and most are located now at lower elevations in valley bottoms. The general characteristics of the surficial materials (soil parent materials) are briefly described. Table 1 relates the various soils to the deposits in the map area.

1.6.1 MORAINAL DEPOSITS

Morainal (glacial till) deposits are materials directly deposited by glacial ice. They are typically non-sorted and have no bedding or stratification. They consist of a mixture of various particle sizes, stones and rock types set into a matrix of sand, silt and clay. They are relatively compact, moderately or slowly permeable and textures usually range from gravelly moderately coarse to gravelly moderately fine with gravelly sandy loam being most common. The deposits are deeper than one metre and are usually found at higher elevations within the map area where they were least influenced by post glacial meltwater sorting, erosion and deposition. In the central and southern portions of the map area the morainal deposits are usually covered by a sandy or loamy windblown (eolian) veneer up to 30 cm thick.

Soils that have developed on morainal materials are found near Okanagan Falls, and at higher elevations near Naramata, Rutland, Summerland and Westbank.

TABLE 1: THE RELATIONSHIP BETWEEN CLASSIFIED SOILS AND SURFICIAL DEPOSITS IN THE MAP AREA

EOLIAN VENEER (<1 m thick) OVER MORAINAL DEPOSITS	EOLIAN VENEER OVER FLUVIOGLACIAL DEPOSITS	EOLIAN VENEER OVER GLACIOLACUSTRINE SEDIMENTS	COLLUVIAL VENEER (<1 m thick) OVER BEDROCK	FLUVIOGLACIAL DEPOSITS			FLUVIOGLACIAL VENEER OVER GLACIOLACUSTRINE SEDIMENTS
		Sandy or Silty		Sandy or Silty	Sandy Veneer Over Gravelly Deposits	Gravelly	Sandy or Silty
Armstrong Giants Head Harriand Hayman Kelowna McDougall	Haynes	Kalamoir	Eaneas Faulder Nkwala Postill	Corporation Dub Lake Kaleden Osoyoos Oyama Parkill Trepanier	Acland Creek Agar Lake Dartmouth Gartrell Paradise Skaha Trout Creek	Debeck Ellison Gammil Peachland Rutland	Knox Mountain Mission Creek Neramata

ORGANIC (<160 cm) OVER FLUVIAL DEPOSITS	DEEP ORGANIC DEPOSITS (>160 cm)	LACUSTRINE BEACH DEPOSITS	GLACIOLACUSTRINE SEDIMENTS		LACUSTRINE SEDIMENTS OVER FLUVIOGLACIAL DEPOSITS	FLUVIAL - COLLUVIAL FAN DEPOSITS	FLUVIAL - COLLUVIAL VENEER OVER GLACIO-LACUSTRINE SEDIMENTS	
		Sandy and Gravelly	Silty and/or Sandy	Clayey		Angular Gravelly	Sandy	Sandy and Gravelly
Kendall Rumohr	Darke Lake	Kloag Pass Solly	Chapman Maynard Munson Olhausen Penticton	Boucherie Glenmore Summerland Westbank	Lambly	Ponderosa Ratnip Stemwinder	Gellatly	Greata McKinley Valley Creek

RECENT FLUVIAL DEPOSITS - FANS			RECENT FLUVIAL DEPOSITS - FLOODPLAIN		
Gravelly	Sandy over Gravelly	Silty	Gravelly	Sandy over Gravelly	Silty over Sandy or Gravelly
Canyonview Manery Pandozy Tomlin Twin Lakes	Burnell Lake Cameron Lake Glenfir Roy Creek Shannon Winslow	Gulsachan Higgin Inkaneep Olalla Priest Creek Similkameen Tanaka	Iitcoola Nighthawk	Bullock Coulthard Keremeos Kinney Snehumpton Susap	Cawston Chopaka Gillanders Strutt

1.6.2 COLLUVIAL DEPOSITS

Colluvial deposits occupy relatively small scattered areas throughout the map area. They occur on or at the base of steep slopes or bedrock ridges and originated by gravity induced movement from nearby upper sources. The deposits are generally loose, non-compact, porous and permeable. Gravelly sandy loam texture with a high proportion of stones and pebbles usually prevail. Deposit depth to bedrock is generally less than one meter.

Soils developed from colluvium occur near Kaleden, Summerland, Naramata, Trepanier and in the area west of the Kelowna Airport.

1.6.3 FLUVIOGLACIAL MATERIALS

Fluvioglacial materials were deposited by glacial meltwater either in contact with glacier ice or beyond the ice margin as outwash. They occur throughout the map area on topography ranging from gently to steeply sloping. The deposits usually consist of stratified gravels and sands with a high proportion of stones and sometimes boulders. Most deposits are deeper than 3 meters and textures vary from gravelly sandy loam or loam to sand and gravel at depth. They are generally moderately to rapidly pervious and rapidly drained unless water tables lies close to surface.

Soils developed from fluvioglacial deposits are widespread; the largest areas are near Osoyoos, Penticton, Summerland, Westbank and East Kelowna.

In some areas the fluvioglacial deposits are capped by a gravel-free veneer up to about 1 meter thick. The origin is either eolian or fluvioglacial and surface textures range from sandy loam to loamy sand.

1.6.4 FLUVIAL DEPOSITS

Fluvial deposits are similar to those of fluvioglacial origin except that the materials have been deposited by present day (post-glacial) streams. Deposits are typically fluvial (alluvial) floodplains, fluvial (alluvial) fans and fluvial-colluvial fans.

(I) Fluvial (alluvial) floodplain deposits occur on flat or gently sloping valley bottom land and consist of stream deposited gravel, sand or silt. Landforms include levees, lower terraces and floodplains of both major and local streams. Moderate to high groundwater tables are usual for parts of the year and flooding during freshet periods is common.

Soils developed on floodplain deposits occur primarily along the Okanagan River between Osoyoos and Okanagan Lake, along the Similkameen River and near Summerland and Kaleden.

(II) Fluvial (alluvial) fans form where streams emerge from steep, narrow valleys onto flatter ground. Decrease in stream gradient, and broadening and shallowing of the stream channel as it emerges from steeper topography leads to sediment deposition and development of braided stream channels across a fan. The numerous fans in the map area consist mainly of layered and sorted, often stony, gravels, sands and silts. The deposits are

generally coarsest at the top (apex) and become gradually finer towards the fan toe where usually sands and silts occur.

The larger areas of soils formed on alluvial fans are located near Inkaneep, Testalinda, Hestor, Penticton, Ellis, Shingle, Trout, Vaseaux, Shuttleworth, Power, Dougall, Sawmill, Mission and Scottie creeks.

(iii) Fluvial-colluvial fans are relatively small debris flow types of fans. They consist of sequences of thin mudflows and act as saturated liquids capable of transporting large cobbles, stones and boulders. Many fans in the Similkameen Valley are of this type and typically contain a large proportion of angular rock fragments.

Soils developed on fluvial-colluvial fans occur in scattered locations, mainly in the Similkameen and southern Okanagan valleys on moderate to steep slopes.

1.6.5 GLACIOLACUSTRINE SEDIMENTS

Glaciolacustrine sediments were deposited in glacial lakes during or shortly after deglaciation. These usually stratified sediments are common in the central and northern portions of the Okanagan Valley and consist of stone and gravel free, moderately and well sorted sands, silts and clays. Thinly interbedded fine sands and silts are most common at depth.

Soils developed in glaciolacustrine sediments occur on either side of Skaha and Okanagan lakes, near Westbank, Boucherie Mountain, Okanagan Mission, Glenmore Valley and Ellison.

1.6.6 EOLIAN DEPOSITS

Eolian deposits result from the transport and redeposition of sand and silt by wind action. Depending upon the particle sizes and wind velocity, some are responsible for sand dune construction while others are deposited as a widespread surface mantle of fine material. Post-glacial wind action on the sandy fluvioglacial deposits near Oliver and Osoyoos have modified the original land surface and thin eolian veneers are also present on most upland morainal deposits. Some volcanic ash may also be incorporated in the eolian deposits.

1.6.7 ORGANIC DEPOSITS

Organic deposits result from accumulation and decay of vegetative matter. They occur under high water table conditions in undrained depressional areas, cut-off meanders on floodplains or poorly drained lower fluvial fans. Some organic materials are interlayered with marl while others are relatively shallow and underlain by fluvial sands and gravels. The organic accumulations are at least 40 cm thick and may range to as much as 5 meters deep. They contain at least 17% organic carbon. The deposits are relatively rare in the map area; soils developed from them occur near Olalla, Oliver, Okanagan Mission and Kelowna Airport.

CHAPTER TWO
SOIL GENESIS, CLASSIFICATION, FIELD METHODS AND MAP COMPILATION

2.1 SOIL GENESIS

Soil is defined as the naturally occurring mineral or organic material on the earth's surface capable of supporting plant growth. The type of soil formed in any one place is the result of the interaction of climate, organisms and topography acting on the soil parent material over time. Soils display a continuum of properties and reflect the variation of these soil forming factors.

The most important factors in soil formation are climate and parent material. In a broad sense, climate determines the type of biological life that, in turn, controls the type of organic matter and the manner in which it is added to the soil. Climate also determines the microorganism activity, the rate of decomposition of organic matter, rate and extent of mineral weathering and rate at which weathering products are accumulated in, or removed from the soil.

Any significant variation in one or more of the soil forming factors produces differences in profile characteristics. Individual soil profiles are grouped according to categories of the soil classification employed. The resultant different groups are then delineated on the soil map by soil boundaries which encompass areas of soils in the same group(s).

Most soils in the Okanagan - Similkameen map area have developed under a grassland - forest vegetation and semi-arid climatic conditions. In the grasslands, organic matter is mainly added to the soil by the decomposition of grasses and herbaceous plant materials and accumulation in the A horizons of these soils. Under these conditions, Brown and Dark Brown Chernozemic soils are prevalent on well and rapidly drained sites. At higher elevations, within the forested area relatively cooler condition persist and Brunisolic soils occur on well and rapidly drained sites. In these soils, organic matter additions to the topsoil are limited and well structured and deep A horizons are either thin or absent. Under the same climatic conditions the soils also show differences due to both texture and mineralogic composition. Luvisolic soils have developed in clay rich parent materials in which clay is translocated to a subsurface layer. Gleysolic soils have developed in poorly drained areas on a variety of parent materials from clay to sand. Saturated conditions are reflected in these soils by dull gray colours and/or iron mottles. Regosolic soils are 'young soils' and in the map area are confined mainly to the Okanagan and Similkameen river floodplains and to a few other steeply sloping sites. Organic soils have developed in very poorly depressional areas. In the map area they are usually moderately decomposed and range from shallow to deep.

2.2 SOIL CLASSIFICATION

The objective of a soil survey is to identify the different kinds of soil present in an area, to group them by means of a classification system and to delineate the areal distribution of the groups on a map. Soils are classified on morphological, field based characteristics observed in a vertical section (soil profile) and on physical and chemical analyses of the soil pedon.

There are five levels or categories in which soils may be grouped together as outline in the Canadian System of Soil Classification, 1978. These are: Order, Great Group, Subgroup, Family,

and Series. The Soil Order is the broadest level of generalization and soils within on order have developed under broadly similar environmental conditions as expressed by the presence or absence of major diagnostic soil horizons. The next lower level of generalization is the Soil Great Group. It consists of soils that have major soil horizons in common thus reflecting the strength of the dominant soil forming process (or processes). The next lower level is the Soil Subgroup: it consists of a group of soils which have common soil horizons reflecting the environmental conditions under which the soils developed. The next lower level is the Soil Family consisting of a group of soils having certain common chemical and physical properties and environmental factors such as particle size, drainage, permeability and others. The soil family constitutes a framework within which soil series can be established.

The basic unit in the field classification system as used in this survey is the Soil Series. A Series consists of a group of soils that have developed on similar parent materials under similar environmental conditions and where soil profile, texture and chemical and physical charcteristics fall within a narrow defined range. Soil phases are variations within a soil series or other hierarchial categories and are due to stoniness, topography, profile depth or other features that affect land use.

2.3 FIELD METHODS AND MAP COMPILIATION

The basic level of soil classification in the Okanagan and Similkameen valley map area is the soil series. To classify the soils and determine their areal extent, numerous roadside cuts, ditches and test pits were examined and described. The number of soil examinations varied with the complexity of the soil landscape; however it is estimated that at least one examination was conducted for each 2 to 10 ha of land.

Various soil characteristics such as type of parent material, texture, structure, consistance, permeability, drainage, colour, horizon sequence and depth and other obervable and measurable features were examined and described. Representative soil profiles were described and sampled by horizons for physical and chemical laboratory analysis (Walmsley et al., 1980). The fieldwork also included observations on slope, drainage, vegetation, bedrock, agricultural and other cultural practises.

Air photographs - approximate scale 1:16 000 - were used as field mapping sheets. After completion of the field mapping, areal photo delineations were transferred to the 1:20 000 scale base maps. A total of 23 soil maps were produced for the map area and form an integral part of this report.

CHAPTER THREE
PARAMETERS USED FOR DESCRIBING THE SOILS

The following guidelines describe in detail the criteria and parameters used in Chapter 4 for describing the 86 individually mapped soils and 5 miscellaneous land types.

3.1 LANDSCAPE PHOTO AND GENERAL COMMENTS

The landscape photograph illustrates the typical setting in which each soil occurs. The general comments include a description of the main soil characteristics, location, topography, drainage, other associated soils, vegetation and land use.

3.2 GENERALIZED SOIL PROFILE

The generalized soil profile diagram provides descriptions and depths of main horizons for each soil series description. All colour values, unless otherwise mentioned, refer to dry Munsel colours. For more detailed descriptions, the reader is referred to the technical soil profile and analysis data stored in the B. C. Soil Information System and available from MAPS-B.C., 553 Superior Street, Victoria, British Columbia, V8V 1X5.

3.3 SOIL LANDSCAPE CROSS SECTION

The diagrams depict the usual landscape position of each soil in relation to other soils and parent materials. The symbols used for the latter are described in Table 2 and are extractd from Terrain Classification, Environment Land Use Committee Secretariat, 1976.

TABLE 2: TERRAIN CLASSIFICATION SYMBOLS

Texture	Genetic Materials	Qualifying Descriptors	Surface Expression
Specific: b - bouldery k - cobbly p - pebbly s - sandy z - silty c - clayey Common: a - blocky r - rubbly g - gravelly f - fines Organic: e - fibric m - mesic h - humic	A - anthropogenic C - colluvial E - eolian F - fluvial L - lacustrine M - morainal O - organic R - bedrock W - marine U - undifferentiated	Clastic: G - glacial Organic: B - bog F - fen S - swamp	b - blanket f - fan h - hummocky l - level m - subdued v - ridged s - steep t - terraced v - veneer

3.4 SOIL CHARACTERISTICS

Depth to Bedrock - approximate depth in meters where applicable.

Parent Material - defined according to the terrain classification system (E.L.U.C., 1976); see Table 2.

Depth to Free Lime - approximate depth in cm. Most of the soils in the map area have calcareous subsoils. This term refers to the lime-free upper soil depth.

Surface Stoniness Class - defined according to the Canadian Soil Survey Committee, 1978.

S_0 Nonstony Phase - land having less than 0.01% of surface occupied by stones.

S_1 Slightly Stony Phase - Stones present offer slight to no hindrance to cultivation. Stones occupy 0.01 to 0.1% of surface.

S_2 Moderately Stony Phase - Enough stones are present to cause some interference with cultivation. Stones occupy 0.1 to 3% of surface.

S_3 Very Stony Phase - There are sufficient stones to handicap cultivation seriously, some clearing is required. Stones occupy 3 to 15% of surface.

S_4 Exceedingly Stony Phase - The stones prevent cultivation until considerable clearing is done. Stones occupy 15 to 50% of surface.

S_5 Excessively Stony Phase - The land surface is too stony to permit cultivation. Stones occupy more than 50% of surface.

Depth to Water Table - approximate depth in meters where applicable.

Perviousness Class - three classes are rapid, moderate and slow and are defined according to Walmsley, et al., 1980. Soil perviousness refers to the soil's ability to transmit water internally, and is inferred from soil characteristics such as structure, texture, porosity, cracks, organic matter content, and shrink-swell properties. It is closely related to measures of permeability, percolation rate, and infiltration rate, but these are reserved for actual measurements using standard techiques. Perviousness applies to the whole soil profile. Because of this, it is determined by the least permeable layer in the soil profile. It is important to distinguish between soil drainage and perviousness. For example, a rapidly pervious soil could be receiving excessive seepage and thus be poorly drained.

a) Rapidly Pervious - The capacity to transmit water vertically is so great that the soil will remain wet for no more than a few hours after thorough wetting. The horizons and soils have large and continuous or connecting pores and cracks that do not close with wetting.

b) Moderately Pervious - The capacity to transmit water vertically is great enough that the soil will remain saturated for no more than a few days after thorough saturation. Most moderately pervious soils hold relatively large amounts of water against the force of gravity, and are considered to have good physical structure for rooting and supplying water to plants. Soil horizons may be single-grained, granular, blocky, weakly platy or massive (but porous).

c) Slowly Pervious - The potential to transmit water vertically is so slow that the horizon or the soil will remain saturated for periods of a week or more after thorough wetting. The soil may be massive, blocky or platy, but connecting pores that conduct water when the soil is wet are few, and cracks or spaces among aggregates that may be present when the soil is dry, close with wetting. Even in positions accessible to plant roots, roots are usually few or absent. When present, roots are localized along cracks.

Soil Drainage - is defined in terms of (i) the actual moisture content in excess of field moisture capacity, and (ii) the extent of the period during which such excess water is present in the plant-root zone. It is recognized that permeability, level of groundwater, and seepage are factors affecting moisture status. However, because these are not easily observed or measured in the field, they cannot generally be used as criteria for drainage classes.

Soil profile morphology, particularly mottling and gleying, often reflects soil drainage. Topographic position and vegetation are other useful field criteria for assessing soil drainage classes.

The soil drainage classes are defined as follows (Walmsley et al., 1980). Additional comments under each class indicate some of the pertinent soil morphological features that are commonly but not necessarily found.

a) Rapidly drained - Soil moisture content seldom exceeds field capacity in any horizon except immediately after water additions. Soils are free of gleying or mottling throughout the profile. Rapidly drained soils often occur on steep slopes and/or have coarse textures.

b) Well drained - Soil moisture content does not normally exceed field capacity in a horizon (except possibly the C) for a significant part of the year. Soils are usually free from mottling in the upper 1 m, but may be mottled below this depth.

c) Moderately well drained - Soil moisture in excess of field capacity remains for a small but significant period of the year. Soils are often faintly mottled in the lower B and C horizons or below a depth of 0.7 m. The Ae horizon, if present, may be faintly mottled in fine and medium textured soils that have a slowly permeable layer below the A and B horizons. In grassland soils the B and C horizons may be only faintly mottled and the A horizon may be relatively thick and dark.

d) Imperfectly drained - Soil moisture in excess of field capacity remains in subsurface horizons for moderately long periods during the year. Soils are often distinctly

mottled in the B and C horizons; the Ae horizon, if present, may be mottled. The soil matrix generally has a lower chroma than the well drained soil on similar parent material. Soils are generally gleyed subgroups of mineral soil orders.

e) Poorly drained - Soil moisture in excess of field capacity remains in all horizons for a large part of the year. The soils are usually strongly gleyed. Except in high chroma parent materials, the B, if present, and upper C horizons usually have a matrix chromas of 3 or less; prominent mottling may occur throughout. Soils are generally in the Gleysolic or Organic order.

f) Very poorly drained - Free water remains at or within 30 cm of the surface most of the year. The soils are usually strongly gleyed. Subsurface horizons usually are of low chroma and yellowish to blueish hues. Soils are generally in the Gleysolic or Organic order; mineral soils usually have peaty phases.

Depth to Restriction - depth in cm. The type of restriction, is also given and may include bedrock, groundwater, clay accummulation (Bt) horizon, compact parent material and/or other impermeable soil layers, and accummulations of lime or salts.

Topography - Table 3 relates slope classes, percent slope, approximate deepness and slope terminology to each other. (The Canadian Soil Information System, CANSIS, 1982 Revised.)

TABLE 3: SLOPE CLASSES

Class	Slope (%)	Approximate Degrees	Terminology
1	0-0.5	0	Level
2	0.5-2.0	0.3-1.1	Nearly level
3	2-5	1.1-3	Very gentle slopes
4	5-9	3-5	Gentle slopes
5	9-15	5-8.5	Moderate slopes
6	15-30	8.5-16.5	Strong slopes
7	30-45	16.5-24	Very strong slopes
8	45-70	24-35	Extreme slopes
9	70-100	35-45	Steep slopes
10	>100	>45	Very steep slopes

3.5 PHYSICAL SOIL PROPERTIES

The following properties relate to the mechanical or physical behavior of the soil.

Unified System

The Unified classification system (Asphalt Institute, 1978) is based on:
1) textural characteristics for soils with a small amount of fines; and,
2) on plasticity - compressibility characteristics for soils where the fine fraction greatly affects their behaviour.

The classification provides a basis for predicting soil behaviour as an engineering construction material. There are eight classes for coarse-grained soils, identified as GW, GP, GM and GC for gravelly materials and SW, SP, SM and SC for sand materials, six classes for fine-grained soils, identified as ML, CL, OL, MH, CH and OH, and one class of highly organic soil is identified as Pt.

TABLE 4: CHARACTERISTICS OF THE UNIFIED SYSTEM

UNIFIED SYMBOL	MATERIAL CHARACTERISTICS
GW	Well-graded gravels, gravel-sand mixtures, little or no fines
GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
GM	Silty gravels, gravel-sand-silt mixtures
GC	Clayey gravels, gravel-sand-clay mixtures
SW	Well-graded sands, gravelly sands, little or no fines
SP	Poorly-graded sands, gravelly sands, little or no fines
SM	Silty sands, sand-silt mixtures
SC	Clayey sands, sand-clay mixtures
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
MH	Inorganic silts, fine sandy or silty soils, elastic silts with liquid limit greater than 50
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
OL	Organic silts and organic silty clays of low plasticity
MP	Inorganic silts, micaceous or diatomateous fine sandy or silty soils, elastic silts
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity, organic silts
Pt	Peat and other highly organic soils

American Association of State Highways Officials (AASHO) System

The ASSHO (Ashphalt Institute, 1978) system is based on the observed field performance of soils under highway pavement; it is widely known and used by highway engineers. In this system a soil is placed into one of seven basic group ratings (A-1 to A-7) on the basis of grain size distribution, liquid limit and plasticity index (see Table 5). Group A-1 are gravelly soils of high bearing strength and are the best soils for subgrade, while groups A-4 to A-7 are the poorest for subgrade. These latter groups are silty or clayey soils having low bearing strength when wet.

Atterberg Limits (Liquid Limit and Plastic Limit)

A fine grained soil can exist in any of several states depending on the amount of water in the soil system. When water is added to a dry soil each particle is covered with a film of water. As more water is added the soil particles tend to slide past one another more easily. The Atterberg Limits (water contents in %) define the boundaries (limits) of the four states:

The liquid limit is the minimum percentage moisture content at which the soil-water mixture changes from a liquid to a plastic state; it represents the moisture content at which the soil will barely flow under an applied force. The limit varies widely. Values of 40 to 60 are for clayey soils although values as high as 80 to 100 are not uncommon. For silty soils, values of 25 to 50 can be expected, and are typical of the medium to fine textured soils in the study area. The liquid limit test is not applied to sandy and gravelly soils; such soils are classified as "non-plastic".

The plastic limit is the minimum percentage moisture content at which the soil-water mixture changes from a plastic to a semi-solid state. It represents the minimum moisture at which puddling is possible and the maximum moisture content at which the soil is friable. It also generally indicates the point of maximum cohesion in the soil. The plastic limits of silts and clays do not vary widely. They usually range from about 5 to 20 with silty soils normally having the lower limits. Pure sand is "non-plastic".

The plasticity index is the arithmetic difference between the liquid and plastic limits and indicates the range of moisture content over which a soil material is in a plastic state. Generally the greater the plasticity index, the greater are the plasticity, compressibility and volumetric change characteristics of the soil.

The plasticity index can be as high as 70 to 80 for very plastic clays although more commonly, clays have values between 20 and 40. Silty materials normally range between 10 and 20. In quality evaluation for highway uses, materials are sometimes restricted to those with liquid limits of 25 or less and maximum plasticity indices of 6, i.e., a predominantly granular material. Plasticity index is an important parameter relating to tilth and workability of soil by tillage implements.

TABLE 5: CLASSIFICATION OF SOILS AND SOIL-AGGREGATE MIXTURES IN THE ASSHO SYSTEM

General Classification	Granular Materials (35% or less passing 0.075 mm)							Silt-Clay Materials (More than 35% passing 0.075 mm)			
Group Classification	A-1		A-3	A-2				A-4	A-5	A-6	A-7
	A-1-a	A-1-b		A-2-4	A-2-5	A-2-6	A-2-7				A-7-5 A-7-6
Sieve Analysis, Percent Passing											
2.00 mm (No. 10)	50 max	---	---	---	---	---	---	---	---	---	---
0.425 mm (No. 40)	30 max	50 max	51 min	---	---	---	---	---	---	---	---
0.075 mm (No. 200)	15 max	25 max	10 max	35 max	35 max	35 max	35 max	36 min	36 min	36 min	36 min
Characteristics of Fraction Passing of 0.425 mm (No. 40)											
Liquid Limit	---		---	40 max	41 min	40 max	41 min	40 max	41 min	40 max	41 min
Plasticity Index	6 max		NP	10 max	10 max	11 min	11 min	10 max	10 max	11 min	11 min
Usual Types of Significant Constituent Materials	Stone Fragments Gravel and Sand		Fine Sand	Silty or Clayey Gravel and Sand				Silty Soils		Clayey Soils	
General Rating as Subgrade	Excellent to Good							Fair to Poor			

Plasticity index of A-7-5 subgroup is equal to or less than Liquid Limit minus 30. Pasticity index of A-7-6 subgroup is greater than Liquid Limit minus 30.

The shrinkage limit is the moisture content at which soil changes from a semi-solid to a solid state. Beyond this point, further reduction in the moisture content is not accompanied by a change in volume. The shrinkage limit was not determined for soils in this map area.

Atterberg limits are most commonly used for determining the suitability of materials for road construction. Generally, soils with high liquid limits, such as clays, have poor engineering properties. Low plasticity indices, on the other hand, indicate granular soils with little or no cohesion or plasticity. Some silty and sandy soils are non-plastic. (Ref.: T. W. Lambe, Soil Testing for Engineers, 1951).

Shear Strength

The shear strength of a soil indicates the relative resistance of that soil to sliding when supporting a load. Cohesion and shear strength are not constant but vary with changes in water content, rate and time of loading, confining pressure, and numerous other factors. Soils that are compacted at drier than optimum moisture content usually exhibit greater shear strength than those that are compacted when wetter than optimum. Soils composed of clean gravel (<5% fines) have the greatest resistance to sliding. Soil shear strength decreases as the content of fines increases and is lowest in fine grained organic soils (OL and OH). Table 6 provides ratings of shear strength for classes in the Unified System (USDA, 1971).

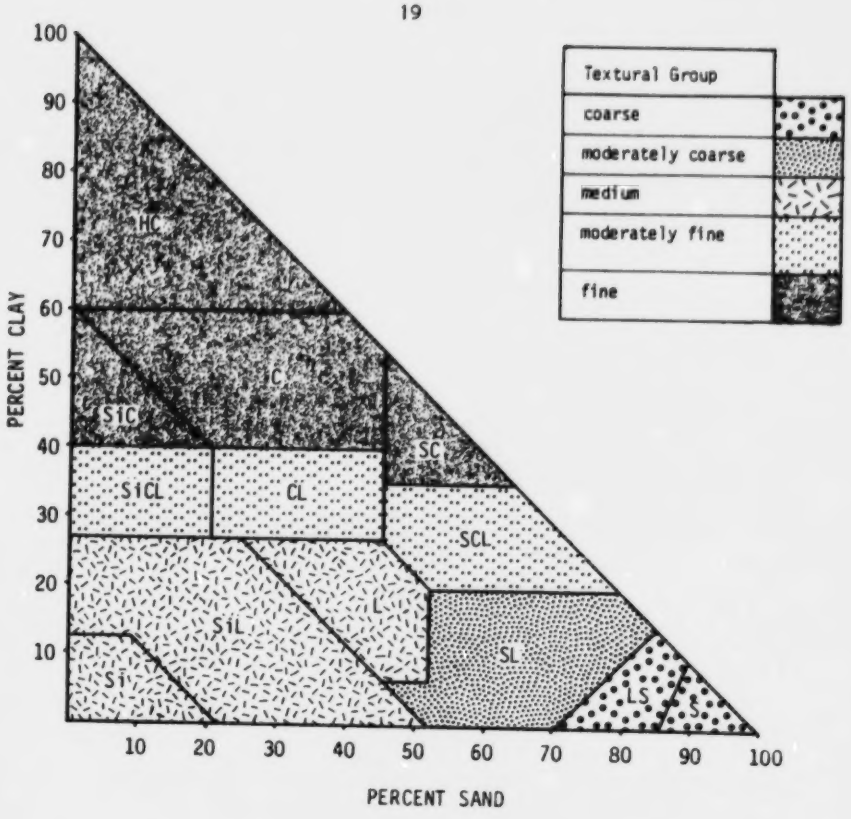
TABLE 6: SHEAR STRENGTH RELATED TO THE UNIFIED CLASSIFICATION SYSTEM

Unified Symbol	Shear Strength
GW	High
GP	High
GM	High-Medium
GC	Medium
SW	High
SP	Medium
SM	Medium
SC	Medium Low
ML	Medium-Low
CL	Medium-Low
MH	Low
CH	Medium-Low
OL	Low
OH	Low
Pt	-

Soil Texture

Texture is an important physical soil property and is defined in terms of the size distribution of primary mineral particles (2 mm diameter or less) as determined by sieve and sedimentation analysis, or field estimation. Particle size separates consist of clay (<0.002 mm), silt (0.002-0.05 mm) and sand (0.05-2.0 m), with the texture classes illustrated in Figure 3.

Texture classes can be modified by the prefix "gravelly" if 20 to 50% of the soil volume is occupied by gravel or "very gravelly" if gravels occupy 50 to 90% of the soil volume. Gravels are defined as fragments between 2 mm and 7.5 cm in diameter.



Textural Group	Texture Classes
coarse	sand(S); loamy sand (LS);
moderately coarse	sandy loam (SL);
medium	loam (L); silt loam (Sil); silt (Si);
moderately fine	sandy clay loam (SCL); clay loam (CL); silty clay loam (SiCL);
fine	clay (C); heavy clay (HC); silty clay (SiC); sandy clay (SC);

Figure 3. Soil Texture Classes and Textural Groups.

Permeability

Permeability is a measure of the downward rate of water movement through a saturated soil. Since laboratory determinations of permeability were not performed, estimates were made based mainly on texture and to a lesser degree soil structure, organic matter and coarse fragment content, porosity, and bulk density (Smith, R. E., 1975).

TABLE 7: CHARACTERISTICS OF SOIL PERMEABILITY RATINGS

Rating	Description
Very Slow	The soil transmits very little, if any, water and generally consists of fine-textured material (clays). Permeability is less than 0.125 cm/hr.
Slow	The soil transmits only slowly and generally consists of moderately fine-textured materials (clay loams and silty clay loams). Permeability is between 0.125 cm/hr and 2.5 cm/hr.
Moderate	The soil transmits water adequately and generally consists of medium-textured materials (loams, silt loams and silts). Permeability is between 2.5 cm/hr and 15.0 cm/hr.
Rapid	The rate of soil water transmission is too great for optimum plant growth. Generally moderately coarse-textured soils such as loamy sand and very gravelly sandy loams dominate. Permeability is between 15.0 cm/hr and 25 cm/hr.
Very Rapid	The rate of water transmission is excessive throughout the soil. Porous soils such as sands and gravels usually occur. Permeability is greater than 25 cm/hr.

Available Water Storage Capacity (AWSC)

The AWSC values represent the amount of water which can be extracted from the soil by plants or is available for plant use. Quantitatively, it is the depth of water held in the soil between field capacity (1/3 atmosphere) and permanent wilting point (15 atmospheres) and is expressed in cm/m (Modified from Irrigation Design Manual, 1983).

TABLE 8: APPROXIMATE RELATIONSHIP BETWEEN AVAILABLE WATER STORAGE CAPACITY AND SOIL TEXTURE

Rating	Approximate AWSC (cm H_2O/m of soil)	Soil Texture*
Very Low	2.0	very gravelly sand
	4.0	very gravelly loamy sand
Low	6.5	sand
	8.5	loamy sand
Moderate	10.5	sandy loam
	13.5	fine sandy loam
	17.5	loam
High	22.0	clay loam
	22.0	clay
	24.8	silt loam
	25.0	peat (organic)

*Soil textures contain no gravel or other coarse fragments except where indicated. If present, the AWSC should be reduced proportionally.

Type of Organic Material

This category applies only to organic soils. Three types of organic material are recognized based on the degree of decomposition: "fibric" is relatively undecomposed with readily identifiable plant fragments, "mesic" is an intermediate stage of decomposition and "humic" is an advanced stage of organic decomposition (C.S.S.C. 1978).

Rubbed Fiber Content

This is a measure for determining the degree of decomposition of organic material. Fibric organic material contains more than 40% fiber, mesic material contains between 10 and 40% fiber and humic material contains less than 10% fiber (C.S.S.C. 1978).

von Post Scale

This empirical rating is a field assessment of degree of organic material decomposition on a scale of 1 to 10: fibric (1-4), mesic (5 or 6), and humic (7 and greater) (C.S.S.C. 1978).

Pyrophosphate Index

This colour test provides another measure of organic material decomposition: fibric (>5), mesic (3-5) and humic (<3). (C.S.S.C., 1978).

Coarse Fragments %

Coarse fragments are mineral particles greater than 2 mm in diameter. They are separated into two classes: those between 2 mm and 7.5 cm in diameter are gravels and those greater than 7.5 cm in diameter are cobbles and stones. Data given are average values based on visual estimates of relative volumes by field sieving and field inspections.

Percent Passing Sieves

This analysis refers to the percent of soil or gravel material which passes through specified sieve sizes and is used to determine proper placement into the Unified system. No. 4 sieves have mesh openings of 4.76 mm, while No. 40 sieves have openings of 0.42 mm. Material passing the number 200 sieve (0.074 mm mesh opening) is considered to be all silt and clay.

3.6 CHEMICAL PROPERTIES

The data presented here are intended to give a general indication of the levels of important soil chemical properties in the Okanagan and Similkameen map area. Typical ranges in the form of high, medium, low and very low are presented for each soil in Chapter Four. Limits for these ranges are explained in the following sections. The ranges, based on soil profile analytical data, provide a general guide for the soils' natural fertility status and management. Cropping and fertilizer applications can drastically alter these relationships.

Soils under cultivation and cropping tend to become depleted of plant nutrients; bases and nitrates tend to be leached out and the tendency for acidification occurs as an ongoing process. Analysis for minor elements has not been done on soils of the map area.

Soil Reaction

Soil reaction or pH is expressed in values from zero to fourteen. A value of seven indicates neutrality; decreasing values below seven indicate acidity, while increasing values above seven indicate increasing alkalinity.

Soil pH was measured by two methods. The first utilized a glass electode in a 1:1 soil-water suspension for mineral soil samples and a 1:5 suspension for organic soil samples. The second method employed a 0.01M $CaCl_2$ solution instead of water. This latter method reduces the effect of varying concentrations of lime and salts and approaches the pH of the "soil solution" under actual field conditions. Values by this method are usually about 0.5 pH unit lower than in water determinations.

Plants vary in their ability to grow at different pH values. Nutrient availability to various plants at different pH values may vary significantly. This is especially borne out in alkaline soils of the Okanagan where growth may be inhibited by low availability of Fe, Mn, and Zn. In general, depending upon the type of crop to be grown, soils with pH (H_2O) values greater between 6.0 do not normally require liming whereas soils with pH (H_2O) values between 5.0 and 6.0 may require liming depending on the crops to be grown. The actual amounts required should be determined by lime requirement test.

The pH of surface and subsurface horizons of Okanagan and Similkameen soils is largely or function the regional climate (less precipitation involves less leaching), soil mineralogy, texture-soil water relationships, organic matter content and type of soil management. The reaction of parent materials in the Okanagan is generally moderately to strongly alkaline.

TABLE 9: SOIL REACTION (pH)

Reaction Class	pH Values (H_2O)
Extremely Acid	<4.5
Very Strongly Acid	4.6-5.0
Strongly Acid	5.1-5.5
Medium Acid	5.6-6.0
Slightly Acid	6.1-6.5
Neutral	6.6-7.3
Mildly Alkaline	7.4-7.8
Moderately Alkaline	7.9-8.4
Strongly Alkaline	>8.5

Salinity Class

Salt content is measured in a saturated soil extract and the resultant electrical conductivity is expressed in millisiemens per centimeter (mS/cm). The following table relates the salinity class to the conductivity of the saturated extract and plant growth conditions. (Modified from U.S.D.A., 1954.)

TABLE 10: SALINITY CLASSES

Salinity Class	Electrical Conductivity (mS/cm)	Plant Growth Conditions
Non saline	<2	Salinity effects negligible. Soils generally free of excess salts; plant growth not inhibited.
Very weakly saline	2-4	Yields of sensitive crops restricted. Soils have very slight amounts of excess salts; sensitive plants may show growth restrictions.
Weakly saline	4-8	Yields of many crops restricted. Growth and yield of salt sensitive plants is inhibited but some salt tolerant plants may not be.
Moderately saline	8-16	Most salt-tolerant crops have lower yields. Soils are moderately affected by excess salt. Plant growth is very inhibited and few crops do well.
Strongly saline	>16	Only a few very salt tolerant plants survive and produce very reduced yields. Soils are strongly affected by excess salt.

Some crop plants can tolerate relatively large levels of salt while others are more easily injured at lower levels. Some crops such as beets may be highly salt tolerant as mature plants, but may be sensitive to salt at the time of germination.

The following table, taken from Agriculture Canada Publication 1624 (Management of Saline Soils by T. G. Sommerfeldt and E. Rapp), indicates the salt tolerance of several common crops.

TABLE 11: SALT TOLERANCE FOR VARIOUS CROPS

High Salt Tolerance 8-15 mS/cm	Medium Salt Tolerance 4-8 mS/cm		Low Salt Tolerance <4 mS/cm
Beets	Tomato	Brome grass	Strawberry
Asparagus	Cabbage	Perennial ryegrass	Radish
Spinach	Cauliflower	Alfalfa	Celery
Canada wildrye	Lettuce	Tall fescue	Green beans
Western wheatgrass	Sweet corn	Rye	White Dutch clover
Barley	Potatoes	Wheat	Alsike clover
Birdsfoot trefoil	Carrot	Oats	Red clover
sugar beet	Onion	Orchard grass	Ladino clover
	Peas	Reed canary grass	Field beans
	Cucumber	Field corn	Peas

Organic Carbon

The amount of organic carbon in soils is a measure of soil organic matter that results from the decomposition and incorporation of leaves, twigs, roots, mosses, seeds and other organic material. The amount of organic matter that accumulates is controlled by vegetation which in turn is related to precipitation, soil drainage and temperature. The amount of organic matter can vary from less than 1% to almost 100%. In cultivated soils, organic matter maintenance is very important as it improves soil fertility and soil structure. It also promotes resistance to crusting, puddling and erosion and increases aeration, friability, moisture holding capacity and cation exchange capacity. Organic matter content can be estimated by multiplying the percent organic carbon by 1.7 (Modified from Metson, A. J., 1961).

TABLE 12: ORGANIC CARBON LEVELS

Rating	Level of Organic Carbon (%)
Very Low	<0.7
Low	0.7-2.0
Moderate	2.0-5.0
Moderately High	5.0-10.0
High	10.0-17.0
Very High	>17.0

The organic matter in soils can be maintained by frequent incorporation of green manures, crop residues, barnyard manure or other organic materials. This helps to maintain adequate levels of soil fertility for crop production. In general, the carbon content of mineral soils is highest at the surface and decreases with depth. Organic soils tend to have organic carbon contents that remain relatively constant throughout the soil profile or increase slightly with increasing depth.

Nitrogen

Plants require large amounts of this major plant nutrient for growth. Nitrogen is utilized mainly in nitrate form which are easily lost from the soil by leaching and in ammonium form which is somewhat less subject to leaching. Soil organic matter and commercial fertilizers are the major nitrogen sources although small amounts are washed in from the atmosphere by rain.

Micro-organisms play an important role in the provision of nitrogen to plants. The ammonifying and nitrifying bacteria convert nitrogen in soil organic matter into forms available for plant uptake. The amount released is influenced by drainage, temperature and C/N ratio of added organic matter. Nitrogen-fixing bacteria, some of which are associated

with roots of legumes (e.g. clover, alfalfa), convert atmospheric nitrogen into forms usable by plants (Modified from Metson, A. J., 1961).

TABLE 13: RELATIVE NITROGEN LEVELS

Rating	% Nitrogen
Very Low	<0.10
Low	0.10-0.25
Medium	0.25-0.40
High	>0.40

Grassland soils in the study area have medium to high nitrogen levels only in the uppermost mineral soil horizon. Except for the thin forest litter on the surface of forested soils which is high, all other horizons are very low in total nitrogen.

Soils having total nitrogen levels of greater than 0.40% in the surface 25 cm are not likely to need much immediate nitrogen fertilization. As most of these values will vary widely from site to site, it is more useful to take individual soil fertility tests when devising a soil fertilization program. Surface soils with values of less than 0.25% total nitrogen will generally require fertilization.

Cation Exchange Capacity

The ability of soils to hold exchangeable cations is termed the cation exchange capacity. It is expressed as milli-equivalents of cations required to balance the negative charge of 100 g of soil at pH 7.0. Exchange sites are mainly supplied by organic matter and clay minerals. Therefore, depending on the organic matter content and the type and amount of clay minerals present, the exchange capacities can range from less than 10 to over 100 milli-equivalents per 100 g of soil. The following values may be used as a guide for the relative levels of exchange capacities of soils (Modified from Metson, A. J., 1961).

TABLE 14: CATION EXCHANGE CAPACITY

Class	Cation Exchange Capacity (Milli-equivalents/100 g)
Very Low	<5
Low	5-10
Medium	10-20
High	20-60
Very High	>100

High cation exchange capacities generally occur in fine-textured soils and soils with high organic matter contents. Organic soils in the map area have cation exchange capacities in the range of 160 to 200 milli-equivalents per 100 g which reflect their very high organic matter content and high potential ability to hold nutrients. For mineral soils, exchange capacities are mostly high in the surface horizon, reflecting high organic matter contents, and decrease to medium and low in the subsoil. Coarse-textured, gravelly and sandy subsoils usually have low cation exchange capacities.

In general, the greater the cation exchange capacity the greater is the soil's ability to retain nutrients (cations), and generally result in higher fertility and less leaching of plant nutrients.

Exchangeable Cations

Calcium, magnesium, potassium, sodium, hydrogen, aluminum and hydroxyaluminum ions are the most abundant exchangeable cations. Their proportions vary from soil to soil depending on soil characteristics and past management practices. Aluminum and hydrogen ions may be abundant in soils, but are not measured directly; rather, they are assumed to make up the remainder of the total cation exchange capacity that is not filled by the basic ions. For the soils of the study area, basic cations account for about 80 to 100% of the cation exchange capacity.

Aluminum and hydrogen cations predominate in acid soils while calcium and magnesium are most common in near neutral to basic soils. Strongly alkaline or saline soils may contain various proportions of exchangeable sodium, calcium and magnesium as well as minor amounts of potassium. Exchangeable calcium and magnesium, removed by crops and lost by leaching, are usually replaced by hydrogen and aluminum and result in a decrease in pH by hydrolysis (Modified from Metson, A. J., 1961).

Exchangeable Calcium (Ca)

Calcium is the dominant basic cation on the exchange complex and is generally not limiting to plant growth in the map area. Calcium values of surface horizons in soils in the map area are generally greater than 4 meq/100 g. Generally, coarse-textured soils with low cation exchange capacities and low organic matter contents have limited ability to retain easily leached cations such as calcium; these soils may require liming. Exchangeable calcium levels below 2.5 meq/100 g are considered low and inadequate for many crops.

TABLE 15: EXCHANGEABLE CALCIUM RATINGS

Rating	Exchangeable Calcium (meq/100 g)
Low	<2.5
Medium	2.5-4.0
High	>4.0

Exchangeable Magnesium (Mg)

Magnesium levels are generally greater than 0.9 meq/100 g in most of the A horizons of mineral soils in the map area. Most subsoils, as well as coarse-textured sands and loamy sands with low organic matter, have lower values. Organic soils in the survey area generally have high levels of exchangeable magnesium and require little or no magnesium fertilization while those with medium to low levels may show beneficial effects with increasing amounts of magnesium fertilizer. Proper rates of fertilizer applications, however, should be determined by individual soil tests and be related to the requirement of the desired crop. (H. Chuah, personal communication).

TABLE 16: EXCHANGEABLE MAGNESIUM RATINGS

Rating	Exchangeable Magnesium (meq/100 g)
Low	<0.45
Medium	0.45 - 0.9
High	>0.9

Exchangeable Sodium (Na)

Sodium is a relatively loosely held ion on the exchange complex and is readily lost and replaced by other ions in the soil solution. The presence of sodium in large quantities, especially in fine-textured soils, is undesirable because of its effect on soil structure. Soils containing appreciable exchangeable sodium tend to become dispersed, are less permeable to water, and have poor tilth. When sodium cations occupy more than 10 to 20% of the cation exchange capacity, the soil develops a poor physical condition, especially if the soluble salt content is low. Coarse-textured soils can tolerate higher amounts of exchangeable sodium than do fine-textured soils before the physical soil condition deteriorates. Also, soils with a high organic matter contents can tolerate a higher amount of sodium than those without it.

Sodium is not considered an essential plant nutrient and becomes toxic to many crops at moderate to high levels.

TABLE 17: EXCHANGEABLE SODIUM RATINGS

Rating	Exchangeable Sodium (meq/100 g)
Very Low	<0.1
Low	0.1 - 0.3
Medium	0.3 - 0.7
High	0.7 - 2.0
Very High	>2.0

Exchangeable Potassium (K)

Exchangeable potassium exists in equilibrium with fixed forms of K in the soil. This equilibrium is disturbed when plants remove the exchangeable form and, to re-establish equilibrium, some fixed potassium is released. The maintenance of an adequate supply depends upon the reserve and rate of release.

Generally soils with high to very high levels of potassium will require little or no potassium fertilization, whereas those with moderate to very low levels of potassium will require increasing amounts of potassium fertilizer with decreasing levels of potassium. The required levels should again be determined by individual soil tests and crop requirements.

TABLE 18: EXCHANGEABLE POTASSIUM RATINGS

Rating	Exchangeable Potassium (meq/100 g)
Very Low	<0.075
Low	0.075 - 0.15
Medium	0.15 - 0.25
Moderately High	0.25 - 0.30
High	0.30 - 0.70
Very High	>0.70

Percent Base Saturation

The base saturation percentage is an important property of soil. It is defined as the percentage of total cation exchange capacity occupied by the basic cations calcium, magnesium, sodium and potassium. Aluminum and hydrogen generally occupy that portion on the exchange complex that is not satisfied by basic cations. The ease with which cations are absorbed by plants is related to the degree of base saturation. For any given soil the availability of basic cations increase with the degree of base saturation. For example, a soil with a base saturation of 80% would provide cations to growing plants far more easily than the same soil with a base saturation of 40% (Tisdale and Nelson, 1960).

The semi-arid soils of the map area generally have base saturations between 80 and 100% in the solum and 100% in the subsoil horizons. These values largely reflect the general alkaline condition and high pH as well as the relative lack of leaching (of nutrients) in the soils.

Phosphorus

Phosphorus is a major essential element required by plants. It occurs in the soil in not readily available forms but is held in various organic and inorganic compounds. As plants can only utilize inorganic forms, therefore, the organic forms must be mineralized (convented) by micro-organisms before plant uptake is possible. The proportion of phosphorus available for plant growth to the total in the soil at any one time is generally small.

TABLE 19: AVAILABLE PHOSPHORUS RATINGS

Rating	Available Phosphorus (ppm)
Very Low	<5
Low	5 - 10
Medium	10 - 20
Moderately High	20 - 30
High	>30

Depending upon the crop to be grown, soils with moderately high to high phosphorus levels will generally require little or no phosphorus fertilization, whereas those with medium to very low values will require varying amounts as determined by individual soil tests and type of crops to be grown.

Sulfur

Sulfur is a minor but essential element for crop growth; it is generally low in most mineral soils in the map area whereas very high values occur in the organic soils.

TABLE 20: AVAILABLE SULFUR RATINGS

Rating	Sulfur (ppm)
Low	<3
Medium	3 - 6
Moderately High	6 - 10
High	10 - 20
Very High	>20

CHAPTER FOUR
DESCRIPTIONS OF THE SOILS

This chapter describes the characteristics of the 86 individual soils and 5 miscellaneous land types classified in the Okanagan and Similkameen map area. Detailed individual profile descriptions with chemical and physical analyses are not included in this report; they are available from the British Columbia Soil Information System.

Several schematic, cross-sectional diagrams are also presented which illustrate the general landscape, elevation and surficial deposit relationships among the more common soils of the map area.

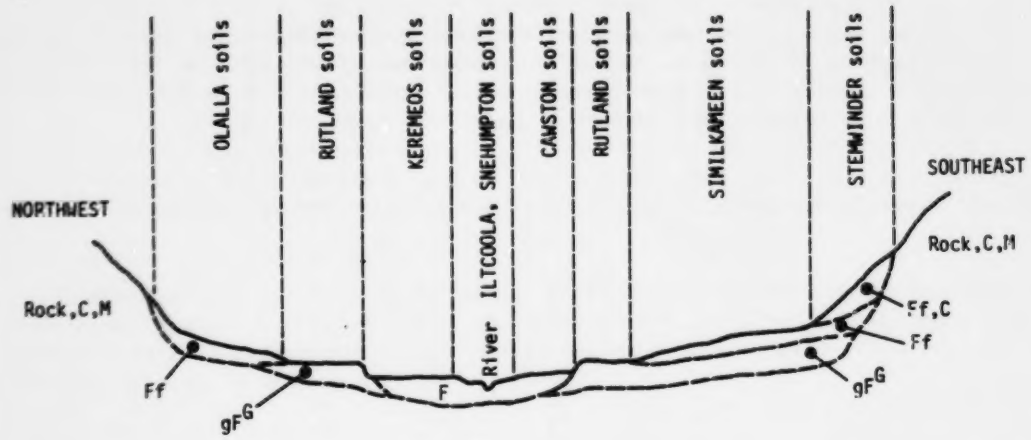


Fig.4. A schematic cross-section of the Similkameen Valley near Keremeos showing the general relationship between elevation, surficial deposits and the more common soils.

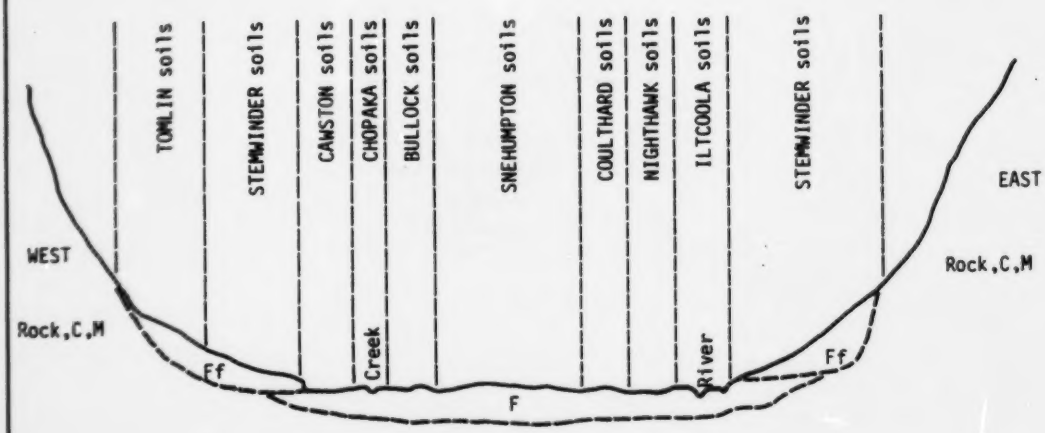


Fig.5. A schematic cross-section of the Similkameen Valley near the International Border showing the general relationship between elevation, surficial deposits and the more common soils.

LEGEND

C- Colluvial deposits
F- Recent fluvial deposits
gF^G- Gravelly fluvioglacial deposits
Ff- Fluvial fan deposits
M- Morainal deposits

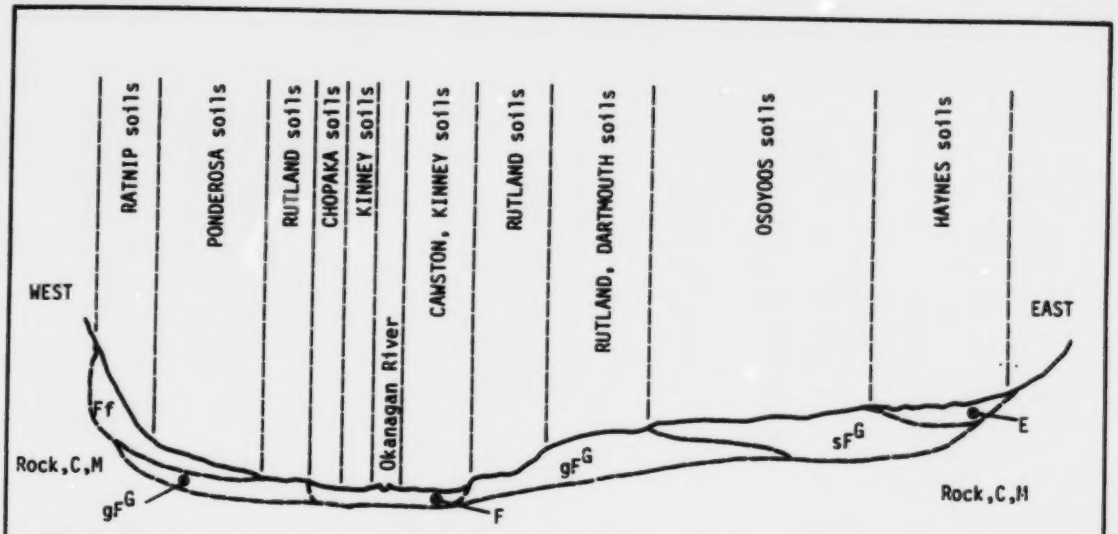


Fig.6. A schematic cross-section of the Okanagan Valley near Oliver showing the general relationship between elevation, surficial deposits and the more common soils.

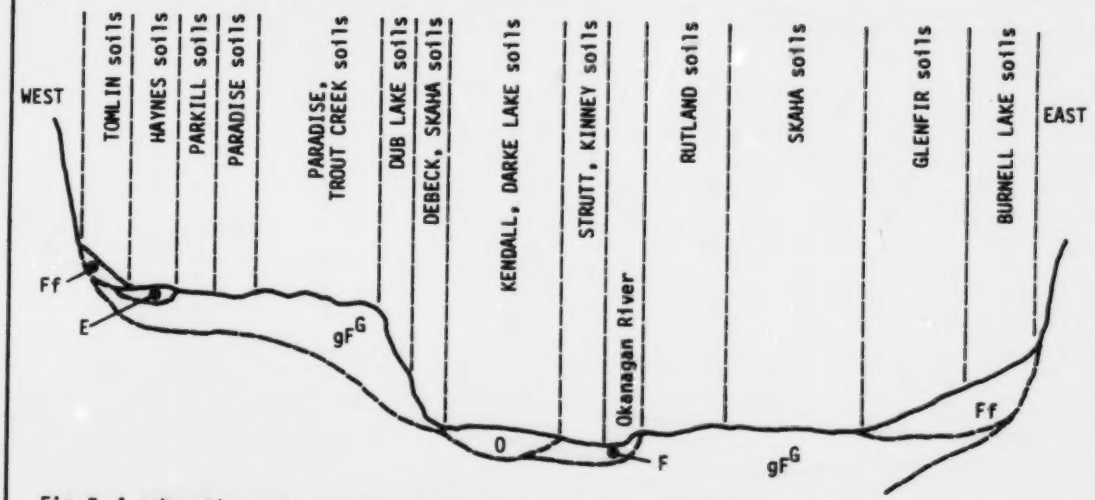


Fig. 7. A schematic cross-section of the Okanagan Valley near McIntire Bluff showing the general relationship between elevation, surficial deposits and the more common soils.

LEGEND

E- Eolian deposits
F- Recent fluvial deposits
gF^G- Gravelly fluvioglacial deposits
sF^G- Sandy fluvioglacial deposits
Ff- Fluvial fan deposits
M- Morainal deposits
O- Organic deposits

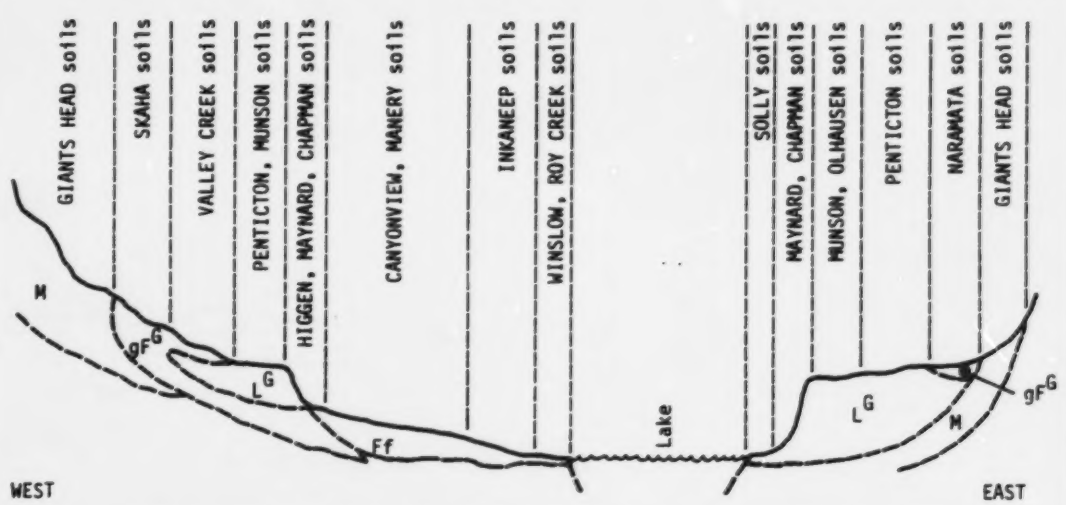


Fig. 8. A schematic cross-section of the Okanagan Valley between Trout Creek and Naramata showing the general relationship between elevation, surficial deposits and the more common soils.

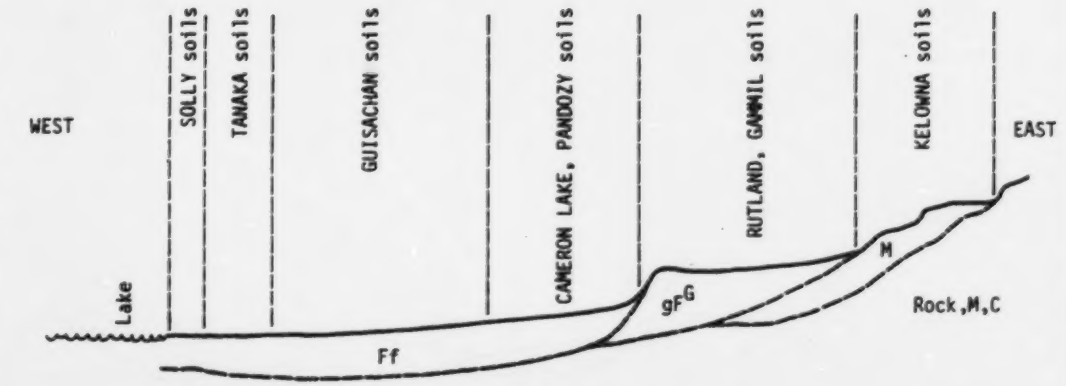


Fig.9. A schematic cross-section of the Okanagan Valley from Okanagan Lake to Rutland showing the general relationship between elevation, surficial deposits, and the more common soils.

LEGEND

Ff- Fluvial fan deposits
gF^G- Gravelly fluvioglacial deposits
L^G- Glaciolacustrine deposits
M- Morainal deposits

DESCRIPTIONS OF THE SOILS

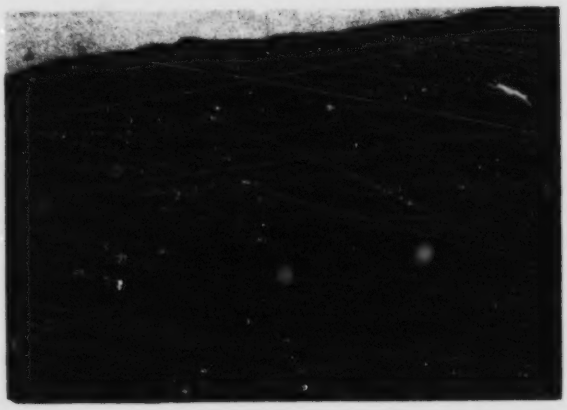
ACLAND CREEK SOILS (AC)

GENERAL COMMENTS

Acland Creek soils occupy relatively few areas and are found near West Summerland, Okanagan Falls, Rutland and East Kelowna. These Orthic Dark Brown soils usually occur in association with Dartmouth, Trout Creek and Oyama soils on topography that varies from gentle to moderate slopes.

Acland Creek soils have developed in gravel-free, moderately coarse to medium textured veneers between 60 and 100 cm thick overlying gravelly fluvioglacial deposits. Surface and subsurface textures are loam or sandy loam while subsoils are very gravelly loamy sand or very gravelly sand. The soils are well drained, moderately pervious, and have moderate to low water holding capacity.

Most areas of Acland Creek soils are cleared, cultivated and planted to tree fruits and vineyards. In some small individual areas, adverse topography and subsoil stoniness may be agriculturally limiting. Uncleared areas support mainly native grasses, sagebrush, rabbitbrush and scattered Ponderosa pine.



Acland Creek soils underlie the orchards in the middle distance.

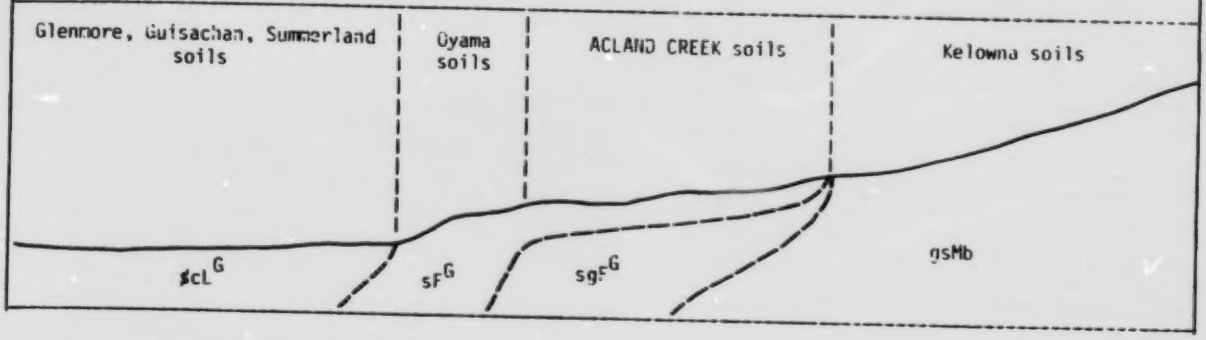
The soils are suited for urban and related uses although the stony subsoil may hinder excavation for basements and other installations. Potential groundwater contamination by septic tank effluent is possible due to poor filtration by the coarse-textured subsoils.

GENERALIZED ACLAND CREEK SOIL PROFILE

DEPTH (cm)		
0-	Ah	Dark grayish brown or brown (10YR 4/2.5), sandy loam or loam; medium, very fine subangular blocky structure; soft consistence.
20-	Bm	Brown (10YR 4.5/3), sandy loam or loam; medium, very fine subangular blocky structure; soft consistence.
40-	Ck or Cca	Pale brown (10YR 6/3), loamy sand or sandy loam; weak, medium pseudo-subangular blocky structure grading to single-grain; soft to loose consistence; moderately calcareous.
60-		
80-	IICk	Pale brown or light brownish gray (10YR 6/2.5), very gravelly sand; single-grain; loose consistence; weakly to moderately calcareous.
100-		

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

ACLAND CREEK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 50
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	SM	SM	GP, GM
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-2-4; A-4	A-1
LIQUID LIMIT	NP	NP	NP
PLASTICITY INDEX	NP	NP	NP
SHEAR STRENGTH	medium	medium	high
SOIL TEXTURE	sandy loam, loam	sandy loam, loamy sand	very gravelly loamy sand, very gravelly sand
PERMEABILITY	moderate	rapid	very rapid
AWSC	low	low	very low
COARSE >7.5 cm (%)	0	0	20-40
FRAGMENTS <7.5 cm (%)	<5	<5	50-90
PASSING # 4	100	100	50-80
SIEVES (%) # 40	60-80	60-80	5-10
#200	30-70	10-30	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	7.6-8.0	8.0-8.6	8.6-8.8
1:2 0.01M $CaCl_2$	7.1-7.6	7.6-8.3	8.1-8.4
SALINITY CLASS	non-saline	non-saline	very weakly saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	low to very low	very low	very low
EXCHANGE CAPACITY	low	low to very low	very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	low to medium	low to medium	low to medium
- Na	very low	very low	very low
- K	medium	medium	medium
BASE SATURATION (%)	100	100	100
PHOSPHOROUS	low	low	low
SULFUR	very low	medium	very high

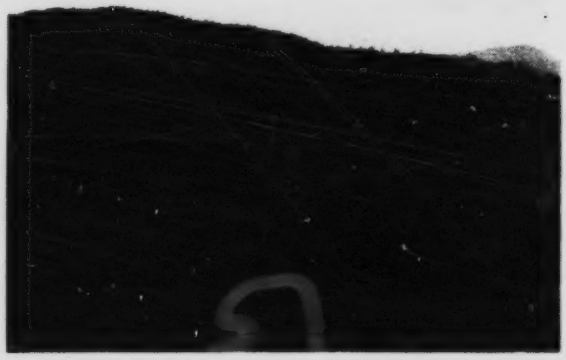
AGAR LAKE (AA)

GENERAL COMMENTS

Agar Lake soils occur on gentle to extreme slopes in association with Haynes, Osoyoos and Skaha soils near Oliver, Penticton and Summerland.

The soils have developed in 60 to 100 cm of medium or moderately coarse textured, gravel-free veneer overlying gravelly fluvioglacial deposits. Surface and subsurface textures are sandy loam or loam, occasionally varying to silt loam. Subsoil textures are very gravelly loamy sand or very gravelly sand. These Orthic Brown soils are well drained, have moderate water holding capacity and are rapidly pervious.

Agar Lake soils are on gentle and moderate slopes and are well suited for agricultural crops. Cleared and cultivated irrigated areas are mostly planted to orchards and vineyards. Extremely sloping areas are limited to grazing uses. Native vegetation typically consists of grasses, sagebrush, rabbitbrush with scattered Ponderosa pine.



Agar Lake soils occupy both the treed and non-treed areas in the middle portion of the photo.

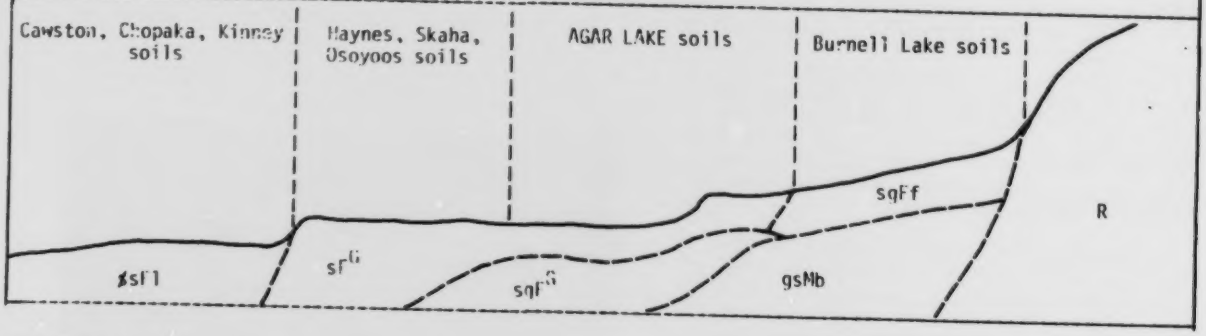
The soils are generally well suited for urban uses although excessive stoniness in the subsoil may hinder basement and other excavations. Incomplete septic effluent filtration due to coarse subsoil textures may cause groundwater contamination.

GENERALIZED AGAR LAKE SOIL PROFILE

DEPTH (cm)		
0-	Ah	Grayish-brown or brown (10YR 5/2.5), sandy loam or loam; moderate, medium subangular blocky structure; friable consistence.
20-	Bm	Brown (10YR 5/3), sandy loam or loam; weak to moderate, medium subangular blocky structure; very friable consistence.
40-		
60-	BCk	Pale brown or brown (10YR 5.5/3), sandy loam or loam; weak, medium subangular blocky structure; very friable consistance; strongly calcareous.
80-		
100-	IICk	Light brownish gray (2.5Y 6/2), very gravelly loamy sand or very gravelly sand; single-grain; loose consistence; moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

AGAR LAKE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 40
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM	SM	GP, GM
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-2-4; A-4	A-1
LIQUID LIMIT	NP	NP	NP
PLASTICITY INDEX	NP	NP	NP
SHEAR STRENGTH	medium	medium	high
SOIL TEXTURE	sandy loam or loam	sandy loam, loamy sand	very gravelly sand or gravelly loamy sand
PERMEABILITY	moderate to rapid	moderate to rapid	very rapid
AWSC	low	low	very low
COARSE >7.5 cm (%)	0	0	0-20
FRAGMENTS <7.5 cm (%)	0-10	0-10	40-75
PASSING # 4	100	100	15-20
SIEVES (%) # 40	60-70	60-80	10-15
#200	30-40	10-30	0-5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.6-8.2	9.4-10.0	9.8-10.2
1:2 0.01M $CaCl_2$	6.8-7.4	8.5-9.0	8.8-9.2
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	very low	very low	very low
EXCHANGE CAPACITY	low to very low	very low	very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	high	high	high
- K	high	high	high
BASE SATURATION (%)	98-100	100	100
PHOSPHOROUS	medium	medium	medium
SULFUR	low to medium	medium	moderately high

ARMSTRONG SOILS (A)

GENERAL COMMENTS

Armstrong soils occupy scattered areas at the higher elevations, mainly east of Rutland near Black Knight Mountain. The Orthic Black soils generally occur on south and west facing, gentle to strong slopes and are usually associated with Kelowna, Dartmouth and Faulder soils.

Armstrong soils have developed in glacial till which usually has a thin veneer of silty eolian material on the surface. Surface and subsurface textures vary from sandy loam to silt loam while subsoil textures are usually gravelly silt loam or gravelly sandy loam. Armstrong soils are well drained, moderately pervious and have moderate water holding capacity.

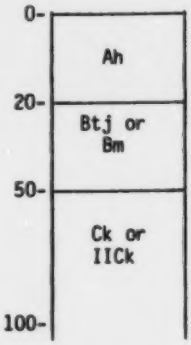
All areas are currently used for natural grazing. The vegetation consists of a variety of native grasses with scattered Ponderosa pine, Douglas fir and aspen.

Steep slopes in smome areas limit suitability for urban uses.

Armstrong soils occur in the open grassy areas in the middle distance.

GENERALIZED ARMSTRONG SOIL PROFILE

DEPTH (cm)

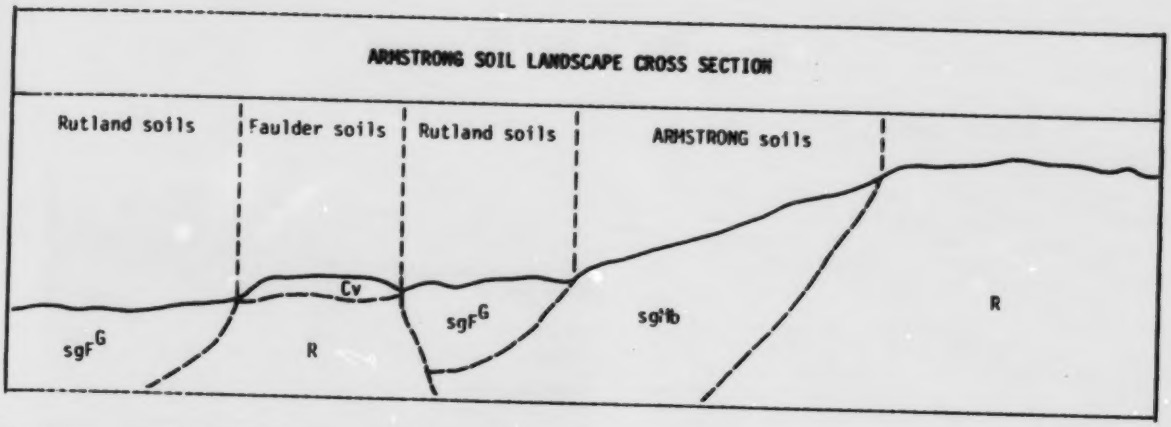


Very dark grayish brown (10YR 3/1.5), sandy loam or silt loam; weak to moderate, very fine subangular blocky structure; friable consistence.

Brown (10YR 5/3), silt loam; moderate, fine subangular blocky structure; friable to firm consistence.

Pale brown (10YR 6/3), gravelly sandy loam or gravelly silt loam; massive; friable to firm consistence; moderately to strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Black



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >1.5
PARENT MATERIAL	: glacial till
DEPTH TO FREE LIME (cm)	: 50
SURFACE STONINESS CLASS	: 1-4
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: generally none, although strongly calcareous subsoil may inhibit roots of some plants
TOPOGRAPHY	: very gentle to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-60 cm	>60 cm
UNIFIED TEXTURE SYMBOL	SM	ML-SM	SM, GM
AASHO TEXTURE SYMBOL	A-2-4	A-4	A-2-4, A-1
LIQUID LIMIT	10-20 or NP	15-28 or NP	15-28
PLASTICITY INDEX	0.1-6 or NP	1-6 or NP	0.1-6
SHEAR STRENGTH	high to medium	high	high
SOIL TEXTURE	sandy loam, silt loam	silt loam, loam	gravelly silt loam, gravelly sandy loam or gravelly loam
PERMEABILITY	moderate	moderate	moderate
AWSC	low to moderate	moderate	moderate
COARSE >7.5 cm (%)	<5	<5	<10
FRAGMENTS <7.5 cm (%)	5-10	5-15	15-30
PASSING # 4	90-100	40-100	20-100
SIEVES (%) # 40	60-80	30-50	20-30
#200	10-20	5-20	<10

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-60 cm	>60 cm
SOIL REACTION (pH) 1:1 H_2O	6.6-7.5	7.2-8.5	8.4-8.9
1:2 0.01M $CaCl_2$	6.0-6.9	6.9-8.0	8.0-8.4
SALINITY CLASS	non-saline	non to very weakly saline	non to very weakly saline
ORGANIC CARBON	moderate	very low	very low
NITROGEN	low to medium	very low	very low
EXCHANGE CAPACITY	medium to high	medium	medium to low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	low to medium	medium to high	high
- K	high	high	medium
BASE SATURATION (%)	90-100	100	100
PHOSPHOROUS	high	high	high
SULFUR	low	medium	high

BOUCHERIE SOILS (BE)

GENERAL COMMENTS

Boucherie soils are mapped near Westbank, Okanagan Mission and in the Glenmore Valley. They occur on very gentle to moderate slopes in association with Glenmore, Gellatly and Westbank soils.

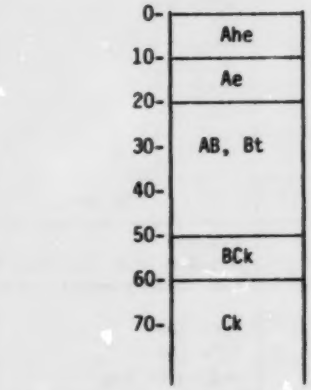
Boucherie soils have developed in interbedded silty to clayey glaciolacustrine sediments. Surface and subsurface textures are silty clay loam or silty clay. Subsoils are mostly silt loam containing thin bands of silty clay loam. These Orthic Gray Luvisol soils are well to moderately well drained, moderately to severely pervious and have moderate to high water storage capacities.

Boucherie soils are moderately well suited for most climatically adapted crops and developed areas are planted to orchards, vineyards and forage. Undeveloped areas support native grasses, various shrubs and Ponderosa pine.

Boucherie soils are moderately to severely constrained for some engineering uses by fine subsoil textures, high shrink-swell potential, medium to low shear potential and moderately slow permeability, which limits efficient septic tank effluent disposal.

The area in the photo is being prepared for construction of a trailer park.

GENERALIZED BOUCHERIE SOIL PROFILE



Grayish-brown (2.5Y 5/2), silty clay or silty clay loam; weak to moderate, fine, granular structure; friable consistence.

Brown (10YR 5/3), silty clay loam; moderate, medium, granular structure; friable consistence.

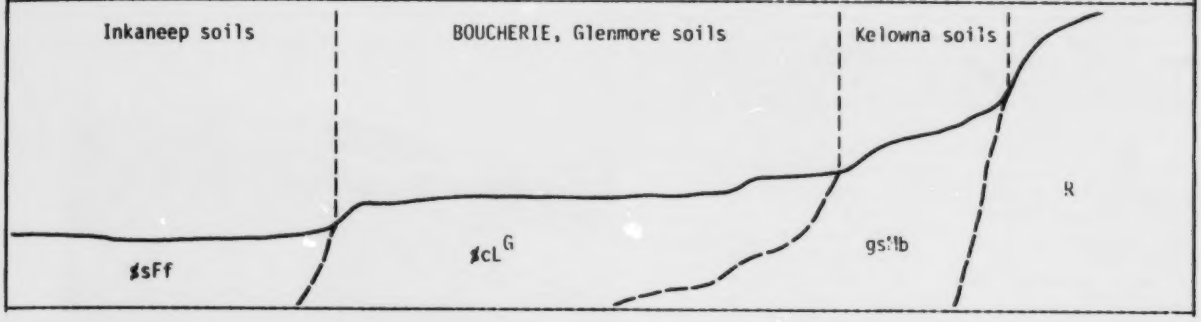
Pale brown or brown (10YR 5.5/3), silty clay loam or silty clay; strong, very fine, angular blocky structure; firm consistence.

Pale brown (10YR 6/3) or grayish-brown (2.5Y 5/2), silty clay loam or silt loam; moderate, fine, angular blocky structure; firm consistence; strongly calcareous.

Light brownish gray (2.5Y 6/2), interbedded silt loam and silty clay loam; moderate to strong, medium, pseudo-platy structure; firm consistence; strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Gray Luvisol

BOUCHERIE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 50
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate to slow
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 30; clay enriched Bt horizon
TOPOGRAPHY	: very gentle to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-60 cm	>60 cm
UNIFIED TEXTURE SYMBOL	CH, CL	CH, CL	CH, CL
AASHO TEXTURE SYMBOL	A-7; A-6	A-7	A-7
LIQUID LIMIT	35-60	35-60	50-65
PLASTICITY INDEX	20-35	20-35	20-35
SHEAR STRENGTH	medium to low	medium to low	medium to low
SOIL TEXTURE	silty clay loam, silty clay	silty clay or silty clay loam	interbedded silty clay loam and silt loam
PERMEABILITY	slow to moderate	slow to moderate	slow
AWSC	high	high	high
COARSE >7.5 cm (%)	0	0	0
FRAGMENTS <7.5 cm (%)	<2	<2	0
PASSING # 4	100	100	100
SIEVES (%) # 40	100	100	100
#200	99	99	99

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-60 cm	>60 cm
SOIL REACTION (pH) 1:1 H_2O	7.0-7.3	7.4-8.0	8.0-8.5
1:2 0.01M $CaCl_2$	6.7-6.9	7.0-7.8	7.8-8.2
SALINITY CLASS	non-saline	non to very weakly saline	very weakly saline
ORGANIC CARBON	moderate	low	very low
NITROGEN	very low to low	low	low
EXCHANGE CAPACITY	high	high	high
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	low	low to medium	high
- K	very high	high	high
BASE SATURATION (%)	85-95	100	100
PHOSPHOROUS	high	low	low
SULFUR	moderately high	low to medium	very high

BULLOCK SOILS (BK)

GENERAL COMMENTS

Bullock soils occur on nearly level and very gentle slopes on the floodplain of the Similkameen River, usually in association with Snehumpton, Cawston and Chopaka soils.

These Gleyed Regosol soils have developed in a moderately coarse textured veneer between 60 and 100 cm thick overlying gravelly fluvial deposits. Surface and subsurface textures are mainly sandy loam or loamy sand. Subsoils are very gravelly loamy sand or very gravelly sand. Bullock soils are imperfectly drained, moderately pervious and have moderate water holding capacity. The watertable fluctuates and is highest in late spring or early summer when the Similkameen River is in freshet stage. The soils generally contain buried, organic enriched horizons signifiying periodic flooding and sediment deposition.

Hay production or pasture is currently the typical land use in cleared areas although most climatically suited crops can be grown if the fluctuating water table and potential for flooding is controlled. Black cottonwood, aspen, dogwood and willow dominate in areas still under natural vegetation.

Bullock soils occupy the central, nearly level portion of the photo.

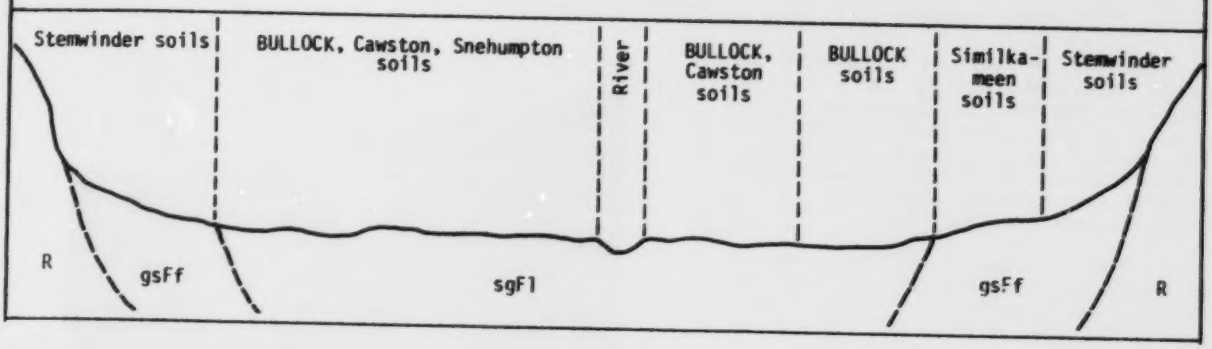
Moderately high water tables and potential for flooding in early summer are the main restriction for urban development. Septic tank effluent may cause groundwater contamination due to incomplete filtration by the coarse-textured subsoils.

GENERALIZED BULLOCK SOIL PROFILE

DEPTH (cm)		
0-	Ck or Ckgj	Grayish-brown (10YR 5/2) to brown (10YR 5/3), sandy loam or loamy sand; weak, fine, granular or pseudo-platy structure grading to structureless; soft or very friable consistence; weakly calcareous; few, fine, faint mottles in lower horizon.
50-	Cgj	Dark yellowish brown (10YR 4/4) to brown (10YR 5/3), sandy loam or loamy sand; weak to moderate, fine subangular blocky structure; very friable consistence; few to common, fine, faint to distinct mottles.
100-	IICgj or IICg	Dark yellowish brown or yellowish-brown (10YR 4.5/4), very gravelly loamy sand; single-grain; loose consistence; few, fine, prominent mottles.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

BULLOCK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: slight calcareousness within upper 60 cm but usually absent
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuates; ranges from about 50 cm to in excess of 1 m
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: imperfect
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0 to 75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	SM-SP	GP-GW
AASHO TEXTURE SYMBOL	A-4; A-2-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly loamy sand, very gravelly sand
PERMEABILITY	moderate	rapid to very rapid
AWSC	moderate	low to very low
COARSE >7.5 cm (%)	0	<5
FRAGMENTS <7.5 cm (%)	<5	50-90
PASSING # 4	100	10-20
SIEVES (%) # 40	60-80	5-20
#200	5-15	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	7.1-7.6	7.0-7.2
1:2 0.01M $CaCl_2$	6.4-6.8	6.4-6.8
SALINITY CLASS	very weakly saline	non-saline
ORGANIC CARBON	low	very low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium	low
EXCHANGEABLE CATIONS - Ca	medium to high	very low
- Mg	medium to high	medium
- Na	low to medium	low
- K	medium	low
BASE SATURATION (%)	92-98	95-100
PHOSPHOROUS	low	low
SULFUR	very high	low

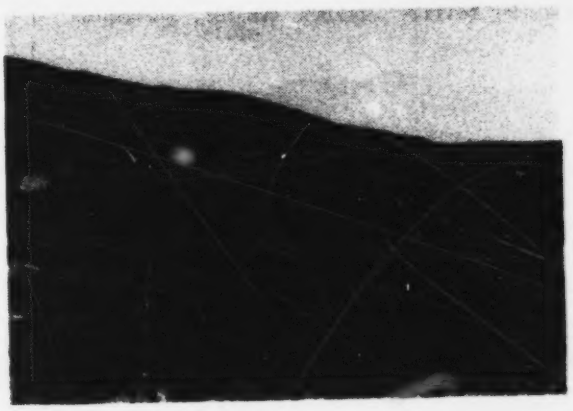
BURNELL LAKE SOILS (BL)

GENERAL COMMENTS

Burnell Lake soils are common in the South Okanagan Valley near Oliver, Penticton, Naramata and Summerland. They occur in several areas scattered throughout the landscape on very gentle to moderately sloping fluvial fan deposits and are usually associated with Skaha, Similkameen, Valley Creek, Maynard and Glenfir soils.

The parent material consists of morainal coarse-textured fluvial fan deposits. Textures are gravelly sandy loam or sandy loam in the upper 10 to 50 cm. Subsoils are gravelly loamy sand or gravelly sand. Moderate amounts of stones are often present. These Orthic Brown soils are well to rapidly drained, are rapidly pervious and have low water holding capacity.

The soils are moderately suited for agricultural use and developed areas are mostly used for irrigated orchards and vineyards. The main limitations are low water holding capacity and sometimes moderate subsoil stoniness. The natural vegetation consisting dominantly of native grasses with some sagebrush and Ponderosa pine only provides limited grazing.



Burnell Lake soils, developed for a vineyard, occupy the central gently sloping portion of the photo. The soils have developed in fluvial fans eroded from the higher-lying fluvioglacial deposits.

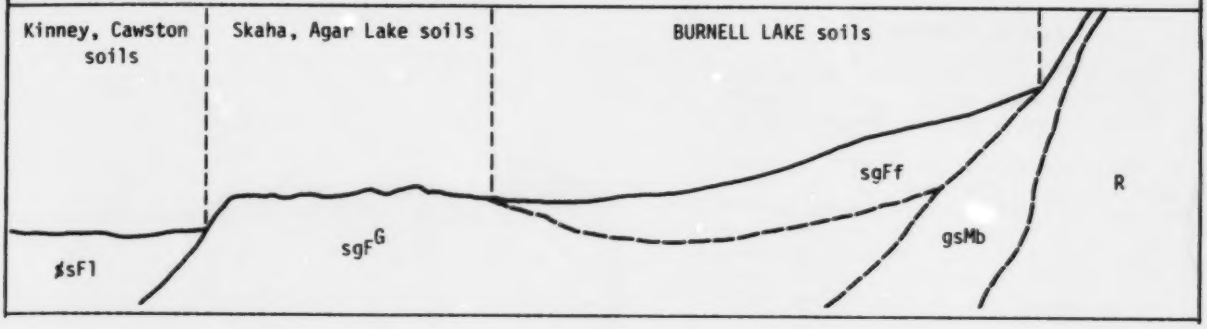
The soils are well to moderately suited for urban and related uses. Septic tank effluent may be incompletely filtered by the coarse textured subsoils and in some areas, stoniness may interfere with excavation.

GENERALIZED BURNELL LAKE SOIL PROFILE

DEPTH (cm)		
0-	Ah	Grayish-brown (10YR 5/2) or brown (10YR 5/3), sandy loam or gravelly sandy loam; weak, very fine subangular blocky structure; loose to soft consistence.
25-	Bm	Pale brown (10YR 6/3), sandy loam or gravelly sandy loam; weak, very fine subangular blocky structure grading to single-grain; soft consistence.
50-	IIBC	Pale brown (10YR 6/3) or very pale brown (10YR7/3), gravelly loamy sand or gravelly sand; single-grain; loose consistence.
75-	IIBC or IIBCk	Pale brown (10YR 5.5/3), gravelly loamy sand or gravelly sand; single-grain; non to moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

BURNELL LAKE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	>2
PARENT MATERIAL	fluvial fan deposits
DEPTH TO FREE LIME (cm)	90
SURFACE STONINESS CLASS	0-2
DEPTH TO WATERTABLE (m)	>2
PERVIOUSNESS CLASS	rapid to moderate
SOIL DRAINAGE CLASS	well to rapid
DEPTH TO ROOT RESTRICTION (cm)	none
TOPOGRAPHY	very gentle to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
UNIFIED TEXTURE SYMBOL	SM	SM, SP
AASHO TEXTURE SYMBOL	A-3, A-4	A-3, A-2-4
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high to medium
SOIL TEXTURE	sandy loam, gravelly sandy loam	gravelly loamy sand, gravelly sand
PERMEABILITY	rapid to moderate	rapid to very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	5-15	5-15
FRAGMENTS <7.5 cm (%)	5-25	20-35
PASSING # 4	80-100	40-80
SIEVES (%) # 40	40-70	30-60
#200	5-15	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
SOIL REACTION (pH) 1:1 H_2O	5.7-7.2	7.3-8.4
1:2 0.01M $CaCl_2$	5.1-6.6	6.6-7.8
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low to very low	very low
EXCHANGEABLE CATIONS - Ca	medium	high
- Mg	low to medium	high
- Na	very low	very low
- K	high	medium
BASE SATURATION (%)	75-100	100
PHOSPHOROUS	high	high
SULFUR	low	low

CAMERON LAKE SOILS (CN)

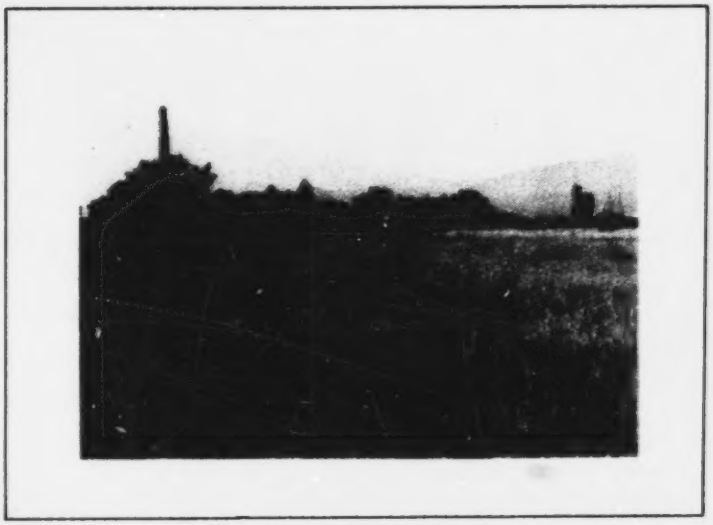
GENERAL COMMENTS

Cameron Lake soils occur primarily near Kelowna in association with Pandozy, Guisachan, Priest Creek and Tanaka soils.

These dominantly imperfectly drained, Gleyed Regosol soils occur on the nearly level and very gentle sloping lower portion of the Mission Creek fan and have sandy loam or loamy sand textures. At depth gravelly material usually is present. Subsoil mottling is caused by a fluctuating water table.

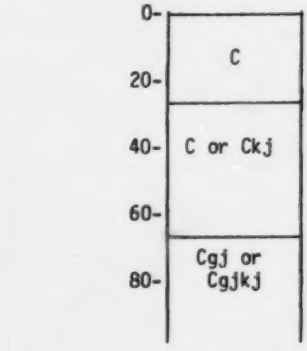
Cameron Lake soils are suited for most agricultural crops although coarse textures and fluctuating high water tables may be limiting in some areas. Cultivated areas are currently mostly used for forage or vegetable production. Native vegetation consists of various shrubs, willows, cottonwood and grasses interspersed with Ponderosa pine and minor amounts of Douglas-fir.

The soils are moderately suited for urban uses. Potential groundwater contamination may occur due to incomplete septic tank effluent filtration in the coarse-textured subsoil and periodically fluctuating high water tables may constrain basements and other excavations.



Cameron Lake soils occupy this nearly level hay field. Pandozy soils are often closely associated with Cameron Lake soils and occur in the treed background.

GENERALIZED CAMERON LAKE SOIL PROFILE



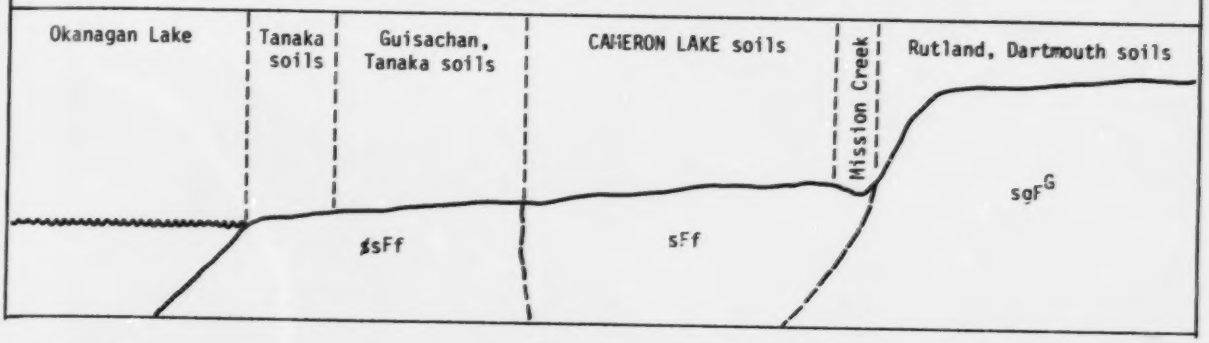
Dark grayish brown (2.5Y 4/3) or olive brown, loamy sand or sandy loam; weak, medium, subangular blocky structure; very friable consistence; very weakly or non-calcareous.

Dark grayish brown or grayish-brown (2.5Y 4.5/2), sandy loam or loamy sand; weak to moderate, medium subangular blocky structure; very friable consistence; very weakly calcareous; few, coarse, prominent mottles.

Grayish-brown (2.5Y 5/2), fine loamy sand to very gravelly sand; weak to moderate, medium subangular blocky structure; friable consistence; weakly calcareous; few, fine, faint mottles.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

CAMERON LAKE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	>2
PARENT MATERIAL	fluvial fan deposits
DEPTH TO FREE LIME (cm)	weakly calcareous at variable depths
SURFACE STONINESS CLASS	0
DEPTH TO WATERTABLE (m)	fluctuating; ranges from about 50 cm to in excess of 1.5 m.
PERVIOUSNESS CLASS	rapid
SOIL DRAINAGE CLASS	dominantly imperfect ranging to moderately well
DEPTH TO ROOT RESTRICTION (cm)	generally none
TOPOGRAPHY	nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	SM, SP	GP, GM
AASHO TEXTURE SYMBOL	A-4; A-3	A-1
LIQUID LIMIT	5-15 or NP	NP
PLASTICITY INDEX	0.1-5.0 or NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly loamy sand or very gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	0	0-8
FRAGMENTS <7.5 cm (%)	0-5	50-80
PASSING # 4	100	100
SIEVES (%) # 40	20-40	20-40
#200	10-30	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	6.8-8.2	7.3-8.1
1:2 0.01M $CaCl_2$	6.5-7.7	7.8-8.6
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	very low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	high	low
- Mg	high	low
- Na	variable	low
- K	very high	low
BASE SATURATION (%)	75-95	95-100
PHOSPHOROUS	low	variable
SULFUR	low	variable

CANYONVIEW SOILS (CY)

GENERAL COMMENTS

Canyonview soils occupy small scattered locations near Oliver, Penticton, Summerland and adjacent to the Ashnola River west of Keremeos and are usually associated with Manery, Burnell Lake and Tomlin soils.

These rapidly drained, nearly level to moderately sloping, Orthic Dark Brown soils have developed in cobbly, very stony and gravelly fluvial fan deposits. Surface and subsurface textures are usually cobbly, very gravelly loamy sand while subsoil textures are gravelly sand or stony gravel. The soils are rapidly drained and rapidly pervious, and have very low water holding capacity.

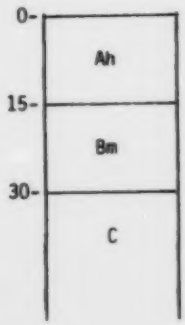
Extreme stoniness and very low water holding capacity severely limit Canyonview soils for agricultural uses and most areas are undeveloped. Natural vegetation consists of grasses, sagebrush, rabbitbrush, scattered Ponderodsa pine and Douglas-fir.

The coarse stony and gravelly conditions constrain urban uses because excavation is difficult and partially allows incompletely filtered septic tank effluent to reach and contaminate the groundwater.

This view, near McIntyre Bluff, shows a typical area of Canyonview soils. Note the stony surface.

GENERALIZED CANYONVIEW SOIL PROFILE

DEPTH (cm)



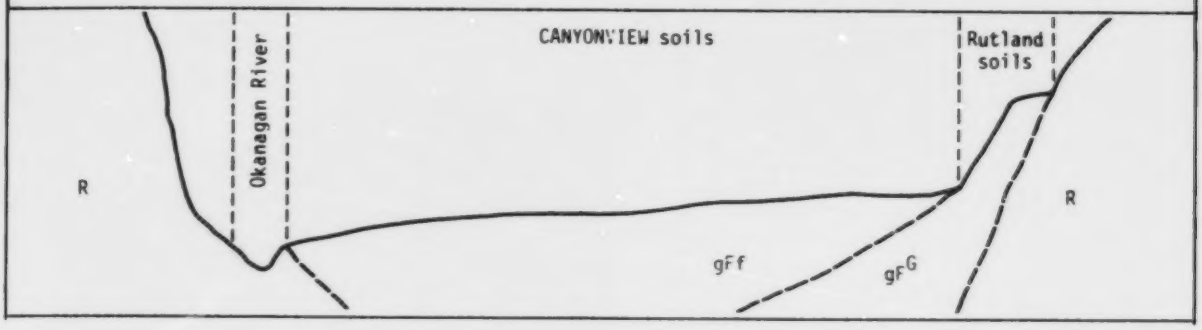
Very dark grayish brown (10YR 3/2), very stony and very gravelly loamy sand; single-grain; loose consistence.

Light brownish gray or light gray (10YR 6.5/2), very stony and very gravelly loamy sand; single-grain; loose consistence.

Pale brown (10YR 6/3), very stony and very gravelly sand; single-grain; loose consistence.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

CANYONVIEW SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	fluvial fan deposits
DEPTH TO FREE LIME (cm)	:	generally >80
SURFACE STONINESS CLASS	:	4-5
DEPTH TO WATERTABLE (m)	:	>2
PERVIOUSNESS CLASS	:	rapid
SOIL DRAINAGE CLASS	:	rapid
DEPTH TO ROOT RESTRICTION (cm)	:	none other than those caused by very stony and gravelly conditions
TOPOGRAPHY	:	nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-15 cm	>15 cm
UNIFIED TEXTURE SYMBOL	GP-GW	GP, GW
AASHO TEXTURE SYMBOL	A-1	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	high	high
SOIL TEXTURE	very stony and very gravelly loamy sand	very stony and very gravelly sand
PERMEABILITY	very rapid	very rapid
AWSC	very low	very low
COARSE >7.5 cm (%)	10-30	20-50
FRAGMENTS <7.5 cm (%)	30-60	30-80
PASSING # 4	10-20	5-15
SIEVES (%) # 40	<10	<5
#200	<1	<1

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-15 cm	>15 cm
SOIL REACTION (pH) 1:1 H_2O	6.0-6.4	6.2-6.6
1:2 0.01M $CaCl_2$	5.4-5.9	5.8-6.6
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate	very low
NITROGEN	medium to low	very low
EXCHANGE CAPACITY	medium	very low
EXCHANGEABLE CATIONS - Ca	high	low
- Mg	medium	low
- Na	very low	very low
- K	medium	medium to low
BASE SATURATION (%)	70-85	80-100
PHOSPHOROUS	high	high
SULFUR	low	low

CAWSTON SOILS (CA)

GENERAL COMMENTS

Cawston soils occur on the floodplain of the Similkameen River near Keremeos and Cawston and on the Okanagan River floodplain between Osoyoos Lake and Penticton. These Rego Humic Gleysol soils occupy slightly depressional to very gently sloping lower fluvial terraces, usually in association with Kinney, Chopaka, Gillanders and Keremeos soils.

Cawston soils have developed in medium textured recent fluvial deposits generally between 50 and 100 cm thick overlying moderately coarse textured materials. Surface and subsurface textures are silt loam or loam. Subsoil texture are usually gravelly sandy loam or gravelly loamy sand. The soils are poorly to imperfectly drained. They are moderately pervious, have a high water holding capacity and slow surface runoff.

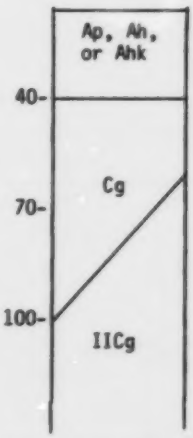
Cawston soils in association with Chopaka and Keremeos soils occupy the gently undulating middle portion of the photo.

Cawston soils are suited for most agricultural crops, particularly if artificial drainage is installed. Most areas are now cleared and cultivated. The more poorly drained areas are mostly used for forage production while the somewhat higher-lying, imperfectly drained areas are used for tree fruits, forages and vegetables. The few, uncleared areas support grasses, cattails, reeds and black cottonwood.

Cawston soils are constrained for urban and similar uses by moderately high water tables which impede basement and other excavations and restrict the operation of septic tank disposal fields.

GENERALIZED CAWSTON SOIL PROFILE

DEPTH (cm)



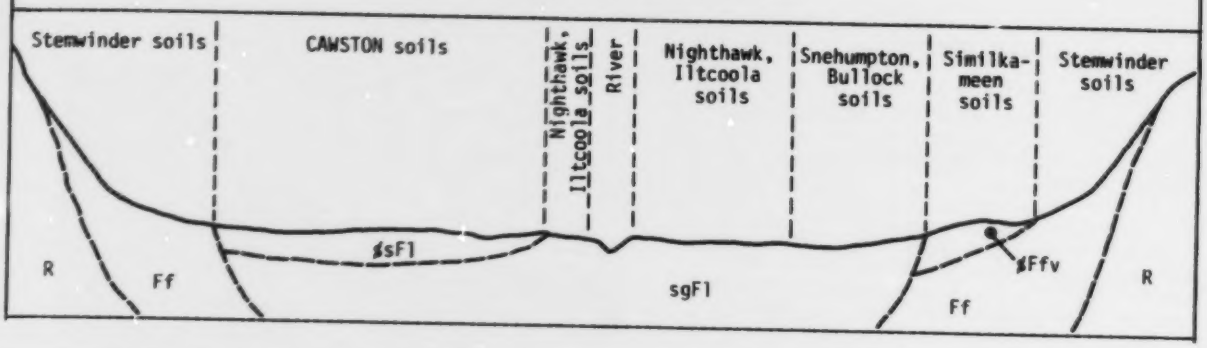
Ap, Ah, or Ahk: Dark grayish brown (10YR 4/2) to very dark grayish brown (10YR 3/2), silt loam or loam; weak to moderate, very fine subangular blocky structure; very friable consistence; weakly to moderately calcareous; none or few, fine, faint mottles.

Cg: Dark grayish brown or very dark grayish brown (10YR 3.5/2), sandy loam to silt loam; weak, fine pseudo-subangular blocky structure; very friable consistence; few, fine, faint mottles.

IICg: Dark brown (10YR 3/3) or brown (10YR 4/3), gravelly sandy loam to very gravelly loamy sand; weak, medium, pseudo-angular blocky structure or single-grain; loose or very friable consistence; few, coarse, prominent mottles.

TAXONOMIC SOIL CLASSIFICATION: Rego Humic Gleysol

CAWSTON SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: weakly to moderately calcareous in surface layer
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuating, ranges from 50 cm to >1 m.
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: dominantly poor, ranging to imperfect
DEPTH TO ROOT RESTRICTION (cm)	: 80; water table
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	ML-CL	SM-ML	GP, GM
AASHO TEXTURE SYMBOL	A-6; A-4	A-6; A-4; A-2-4	A-1
LIQUID LIMIT	30-35	25-35	NP
PLASTICITY INDEX	1-15	1-12	NP
SHEAR STRENGTH	medium to low	low to medium	high
SOIL TEXTURE	loam, silt loam	silt loam to sandy loam	very gravelly loamy sand, gravelly sandy loam
PERMEABILITY	moderate	moderate	rapid
AWSC	moderate	moderate to low	very low
COARSE >7.5 cm (%)	0	0	5-10
FRAGMENTS <7.5 cm (%)	0	0-5	35-60
PASSING # 4	100	100	5-10
SIEVES # 40	60-80	60-80	<5
#200	40-60	50-70	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.9-8.0	7.7-8.0	7.8-8.4
1:2 0.01M $CaCl_2$	7.6-8.0	7.4-7.6	7.6-8.0
SALINITY CLASS	non to very weakly saline	non-saline	non-saline
ORGANIC CARBON	moderate	very low	very low
NITROGEN	medium to high	very low	very low
EXCHANGE CAPACITY	high	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	medium to high	low
- Na	low	low	low
- K	high	moderately high	low
BASE SATURATION (%)	100	100	100
PHOSPHOROUS	very low	very low	very low
SULFUR	moderately high	moderately high	moderately high

CHAPMAN SOILS (CH)

GENERAL COMMENTS

Chapman soils occur on strongly to steeply sloping, often eroded areas generally adjacent to Okanagan Lake and often in association with Maynard, Munson and Penticton soils.

Chapman soils have developed in medium textured stratified, stone-free, calcareous and sometimes saline glaciolacustrine sediments. Surface texture is usually sandy loam or occasionally silt loam. Subsurface and subsoil textures vary from silt loam to silty clay loam. The subsoil may contain thin, fine sandy lenses. These Orthic Regosol: calcareous phase soils are well drained, have moderate to rapid surface runoff and high water holding capacity.

The soils occur only under natural conditions since steep slopes and instability preclude use for arable agriculture and urban uses. Native vegetation includes various grasses, juniper, sagebrush and scattered Ponderosa pine in ravines.

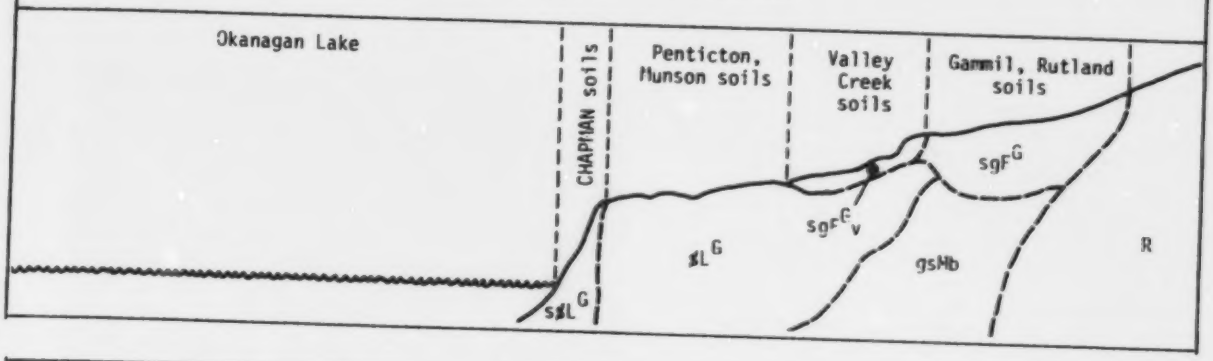
Typical very steeply sloping escarpments supporting Chapman soils.

GENERALIZED CHAPMAN SOIL PROFILE

DEPTH (cm)		
0-	Ahk	Brown (10YR 5/3), sandy loam or silt loam; weak to moderate, fine, subangular blocky structure; soft consistence; weakly calcareous.
10-	ACk or Ck	Pale brown (10YR 6/3) to light brownish gray (10YR 6/2), silt loam or fine sandy loam; slightly hard to hard consistence; strongly calcareous.
50-	CKs	Light gray (10YR 7/1.5), silty clay loam or silt loam; weak, fine, pseudo-platy structure; hard consistence; strongly calcareous; weakly saline.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol; calcareous phase

CHAPMAN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: usually calcareous to the surface
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2; sidehill seepage may occur
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: 40; salinity and strong calcareousness in the subsoil
TOPOGRAPHY	: strong to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	ML	ML, CL
AASHO TEXTURE SYMBOL	A-4; A-7	A-4; A-7
LIQUID LIMIT	35-60 or NP	35-60 or NP
PLASTICITY INDEX	10-25 or NP	10-25 or NP
SHEAR STRENGTH	medium to low	medium to low
SOIL TEXTURE	silt loam, sandy loam	silt loam, silty clay loam
PERMEABILITY	moderate	moderate to slow
AWSC	high	high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0-5
PASSING # 4	100	100
SIEVES (%) # 40	40-95	100
#200	30-60	98-100

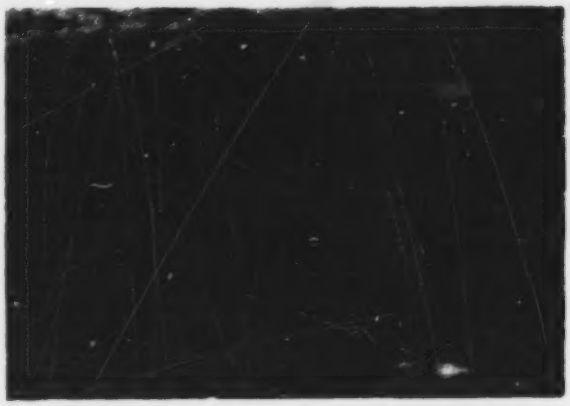
CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	7.2.8.5	8.3-8.6
1:2 0.01M $CaCl_2$	6.8-8.1	7.8-8.4
SALINITY CLASS	very weakly to weakly saline	weakly saline
ORGANIC CARBON	very low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium to low	medium to low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	medium to high	high
- K	high	moderately high
BASE SATURATION (%)	90-100	100
PHOSPHOROUS	low	low
SULFUR	moderately high	high

CHOPAKA SOILS (CK)

GENERAL COMMENTS

Chopaka soils are restricted to the lowest lying portions of the Similkameen River floodplain near Keremeos and Cawston and the Okanagan River floodplain between Osoyoos and Penticton. They occupy depressional to gently sloping areas on the lowest terraces and usually occur in association with Kinney, Cawston and Gillanders soils.

The parent material of these Rego Humic Gleysol soils is 10 to 50 cm of loam or clay loam over interbedded sandy loam, gravelly sandy loam or silt loam fluvial deposits. The poorly to very poorly drained Chopaka soils generally have high groundwater tables and are subject to flooding during the freshet season. The soils are moderately pervious and have a high water holding capacity and slow surface runoff. The underlying subsoil is usually permanently saturated by groundwater.



Chopaka soils occupy the depressional, shrub vegetated middle portion of the photo.

Chopaka soils, where not artificially drained, are limited agriculturally by high water tables. Presently cleared and cultivated areas are used mostly for forages, vegetable and hay production. Uncleared areas support a variety of grasses, shrubs, and black cottonwood.

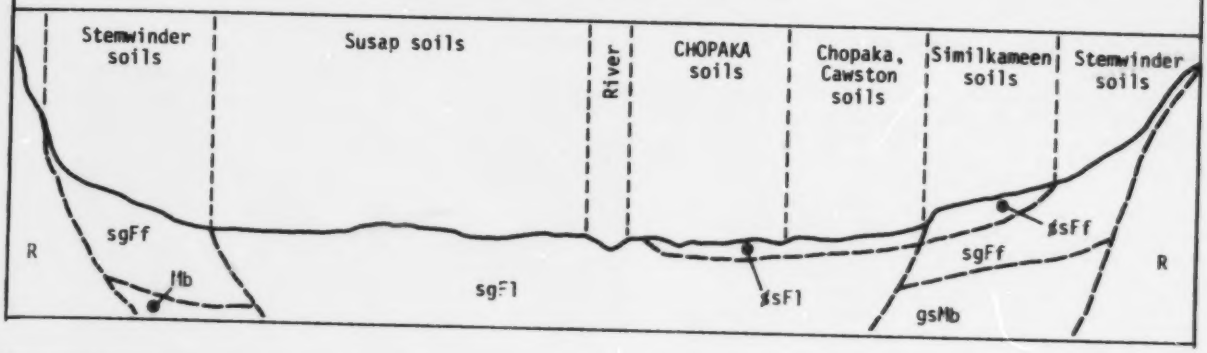
Urban and similar uses are poorly suited for Chopaka soils. Low bearing strengths may require special foundation construction and excavations will contain water during parts of the year. Septic tank disposal fields may be severely impeded by the high water tables. Periodic inundation may be a hazard.

GENERALIZED CHOPAKA SOIL PROFILE

DEPTH (cm)		
0-	Ah, Ahk	Very dark grayish brown (10YR 2.5/1.5), silty clay loam or loam; moderate, fine, granular structure; slightly hard consistence; weakly to moderately calcareous.
20-	ACg, ACkg	Very dark gray to very dark grayish brown (10YR 3/1.5), clay loam, loam or silty clay loam; moderate, fine, subangular blocky structure; firm consistence; many, fine, faint mottles; moderately to weakly calcareous.
40-	Cgk	Dark grayish brown (2.5Y 4.5/7), silty clay loam; moderate, fine, subangular blocky structure; friable consistence; many, fine, distinct mottles; moderately to strongly calcareous.
60-	IICg	Gray to dark gray (5Y 4.5/1), fine sandy loam interbedded with silt loam and gravelly sandy loam; massive; very friable to friable consistence; common to few, prominent mottles.
80-		

TAXONOMIC SOIL CLASSIFICATION: Rego Humic Gleysol: calcareous phase

CHOPAKA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: moderate to weakly calcareous to about 60 cm; lime-free below 60 cm
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: varies between 0 and 100 cm
PERVIOUSNESS CLASS	: moderate to slow
SOIL DRAINAGE CLASS	: poor to very poor
DEPTH TO ROOT RESTRICTION (cm)	: 70; water table
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	ML-CL	CL, ML
AASHO TEXTURE SYMBOL	A-4; A-7	A-4; A-7
LIQUID LIMIT	35-60 or NP	35-60 or NP
PLASTICITY INDEX	10-25 or NP	10-25 or NP
SHEAR STRENGTH	medium to low	medium to low
SOIL TEXTURE	loam, silty clay loam, clay loam	sandy loam, silt loam, gravelly sandy loam
PERMEABILITY	moderate to slow	slow to moderate
AWSC	high	high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0-25
PASSING # 4	100	100
SIEVES (%) # 40	98-100	85-100
#200	60-80	60-95

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	6.9-7.5	7.0-7.9
1:2 0.01M $CaCl_2$	6.3-7.1	6.6-7.5
SALINITY CLASS	non to very weakly saline	non to very weakly saline
ORGANIC CARBON	high to moderately high	low to very low
NITROGEN	medium to high	very low
EXCHANGE CAPACITY	medium to high	medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	very low	very low
- K	high	medium
BASE SATURATION (%)	100	100
PHOSPHOROUS	low	low
SULFUR	very high	very high

CORPORATION SOILS (CP)

GENERAL COMMENTS

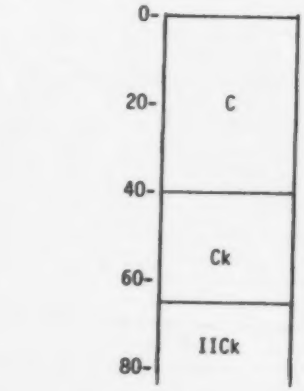
Corporation soils occur in scattered locations mainly in the southern portion of the map area in association with Osoyoos, Kaleden and Parkill soils.

These rapidly drained Orthic Regosol soils occupy terrace faces and other steep escarpments in areas of mostly sandy fluvioglacial deposits. Surface and subsurface textures are sandy loam or loam; subsoils are gravelly loamy sand. The soils are rapidly pervious and have low water holding capacity.

Corporation soils are severely constrained for urban and agricultural uses because of steep topography and potential slope instability. Most areas are uncleared and support a variety of grasses, sagebrush, scattered shrubs and Ponderosa pine; some unstable areas are devoid of vegetation.

A typical view near Summerland showing steeply sloping, coarse-textured Corporation soils.

GENERALIZED CORPORATION SOIL PROFILE



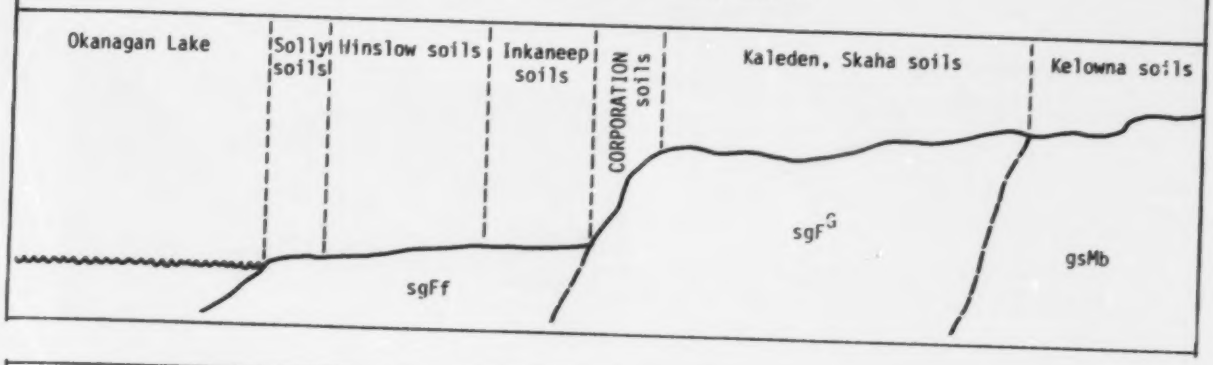
Light brownish gray (2.5Y 6/2), sandy loam or loam; weak, medium, subangular blocky structure; very friable consistence.

Pale brown (10YR 6/3), loamy sand, sand or occasionally gravelly loamy sand; weak, coarse, subangular blocky structure grading to single-grain; friable or very friable consistence; moderately calcareous.

Pale brown (10YR 6/3), gravelly sand or gravelly loamy sand; weak, medium, subangular blocky structure grading single-grain; strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol

CORPORATION SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	>2
PARENT MATERIAL	fluvioglacial deposits
DEPTH TO FREE LIME	40
SURFACE STONINESS CLASS	0
DEPTH TO WATERTABLE (m)	>2
PERVIOUSNESS CLASS	rapid
SOIL DRAINAGE CLASS	rapid
DEPTH TO ROOT RESTRICTION (cm)	none
TOPOGRAPHY	strong to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-40 cm	>40 cm
UNIFIED TEXTURE SYMBOL	SM, SW	GP, GW, SP
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-1, A-2-4
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loam	loamy sand to gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	moderate	very low to low
COARSE >7.5 cm (%)	0-5	0-5
FRAGMENTS <7.5 cm (%)	0-20	15-30
PASSING # 4	95-100	80-100
SIEVES (%) # 40	20-40	50-70
#200	15-35	5-15

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-40 cm	>40 cm
SOIL REACTION (pH) 1:1 H_2O	7.6-8.3	7.8-8.5
1:2 0.01M $CaCl_2$	7.1-8.0	7.5-8.1
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low to moderate	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	low	low
- Na	low	low
- K	low	low
BASE SATURATION (%)	98-100	100
PHOSPHOROUS	high	low
SULFUR	low	low

COULTHARD SOILS (CD)

GENERAL COMMENTS

Coulthard soils occur on the floodplain of the Similkameen River near Keremeos and Cawston, usually in association with Snehumpton, Susap and Bullock soils. The topography generally consists of nearly level and very gentle slopes.

The soils have developed in 60 to 100 cm of gravel-free, sandy loam or loamy sand veneer overlying gravelly fluvial deposits. These Orthic Regosol soils are well to moderately well drained, rapidly to moderately pervious and have slow surface runoff and low water holding capacity. Undyked areas are susceptible to flooding during exceptionally high freshets.

Coulthard soils are well suited for irrigated agriculture and cleared areas are currently used for hay, alfalfa and vegetable production. The native vegetation is dominated by grasses, willows, aspen, Ponderosa pine and near the river's edge, black cottonwood.

Urban development is generally suited for Coulthard soils although incomplete filtration of septic tank effluent by the coarse subsoil textures may potentially contaminate the groundwater. Additionally, undyked areas may occasionally flood.

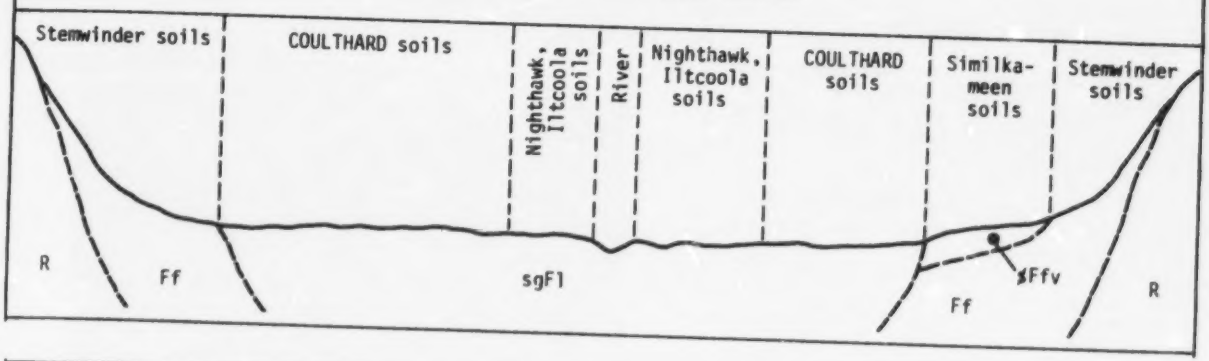
An undeveloped area of Coulthard soils west of Keremeos.

GENERALIZED COULTHARD SOIL PROFILE

DEPTH (cm)		
0-	Ah, Apk	Grayish-brown or brown (10YR 5/2.5), sandy loam or loamy sand; moderate to strong, fine, subangular blocky structure; hard consistence; moderately to weakly calcareous.
25-	C	Brown or yellowish-brown (10YR 5/3.5), loamy sand or sand; weak, medium to fine, subangular blocky structure grading to single-grain; loose or very friable consistence.
50-		
75-		
100-	IIC	Very pale brown (10YR 7/4) or brownish-yellow (10YR 6/6), very gravelly sand or very gravelly loamy sand; single-grain; loose consistence.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol

COULTHARD SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: generally weakly to moderately calcareous only in the upper 20 cm
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: usually >1.5
PERVIOUSNESS CLASS	: rapid to moderate
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM, SP	GP-GW
AASHO TEXTURE SYMBOL	A-4; A-2-4	A-1
LIQUID LIMIT	10-20 or NP	NP
PLASTICITY INDEX	1-5 or NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly loamy sand; very gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	low to moderate	very low
COARSE >7.5 cm (%)	0	10-20
FRAGMENTS <7.5 cm (%)	0-10	50-90
PASSING # 4	100	50-70
SIEVES (%) # 40	30-60	20-40
#200	10-40	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.4-8.0	7.0-7.5
1:2 0.01M $CaCl_2$	6.9-7.5	6.6-7.1
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium to low	very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	medium	low
- Na	low	low
- K	medium	low
BASE SATURATION (%)	100	100
PHOSPHOROUS	high	low
SULFUR	high	medium

DARKE LAKE SOILS (DL)

GENERAL COMMENTS

Darke Lake soils occur near Oliver and Summerland in association with Kendall soils. Their usual topography varies from nearly level or depressional to very gently sloping.

The soils have developed in organic deposits at least 160 cm thick and are composed of sedge and woody material. The surface layer is mainly well decomposed while subsurface and subsoil horizons are partially decomposed. These Typic Mesisol soils are very poorly drained, moderately pervious and have a very high water holding capacity.

Darke Lake soils are moderately well suited for some specialized agricultural crops. Drainage is required to control the water table and specialized equipment may be needed for cultivation. Cleared, cultivated and drained areas are currently used for vegetable and forage production. Uncleared areas support willows, birch, some grasses, sedges and cattails.

A typical area of the nearly level Darke Lake soils currently used for forage production.

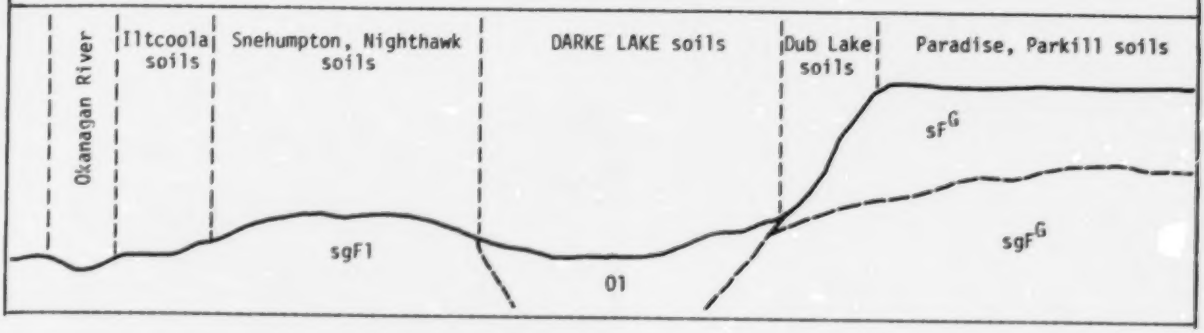
Darke Lake soils are severely constrained for urban and related uses. Low bearing strength may cause foundation instability and high water tables and periodic flooding preclude basements. The high water tables also severely constrain septic tank effluent disposal.

GENERALIZED DARKE LAKE SOIL PROFILE

DEPTH (cm)		
0-	Ohca	Dark gray (5YR 4/1-5.5/1), humic organic material; weak, very fine granular structure; very friable consistence; moderately to strongly calcareous.
25-	Oh	Dark gray (5YR 5/1), humic organic material; weak, very fine granular structure; very friable consistence.
50-	Om	Gray (5YR 4.5/1), mesic organic material; massive; very friable consistence.
75-		
100-		
160-		

TAXONOMIC SOIL CLASSIFICATION: Typic Mesisol; calcareous phase

DARKE LAKE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >5
PARENT MATERIAL	: deep organic deposits
DEPTH TO FREE LIME (cm)	: only the surface layer is calcareous
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuates between 10 cm and 1 m
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: very poor
DEPTH TO ROOT RESTRICTION (cm)	: 50; groundwater table
TOPOGRAPHY	: nearly level to depressional

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-35 cm	>35 cm
UNIFIED TEXTURE SYMBOL	Pt	Pt	Pt
AWSC	high	high	high
TYPE OF ORGANIC MATERIAL	humic	humic	mesic
RUBBED FIBRE CONTENT (%)	6	9	30
von POST SCALE	9	7	5, 6
PYROPHOSPHATE INDEX	2	3	6
COARSE >7.5 cm (%)	N/A	N/A	N/A
FRAGMENTS <7.5 cm (%)	N/A	N/A	N/A
PASSING # 4	N/A	N/A	N/A
SIEVES (%) # 40	N/A	N/A	N/A
#200	N/A	N/A	N/A

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-35 cm	>35 cm
SOIL REACTION (pH) 1:1 H_2O	7.8	6.4	5.7-6.5
1:2 0.01M $CaCl_2$	7.6	6.0	5.4-6.1
SALINITY CLASS	non or very weakly saline	non or very weakly saline	non-saline
ORGANIC CARBON	very high	very high	very high
NITROGEN	very high	very high	very high
EXCHANGE CAPACITY	very high	very high	very high
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	low to very low	low to very low	low to very low
- K	high	low	moderately high
BASE SATURATION (%)	100	60	65-70
PHOSPHOROUS	high	low	very low
SULFUR	very high	very high	very high

DARTMOUTH SOILS (DH)

GENERAL COMMENTS

Dartmouth soils occur throughout the central Okanagan Valley portion of the map area, mostly on nearly level to strong slopes and frequently in close association with Rutland soils.

Dartmouth soils have developed in a gravel-free, moderately coarse to medium textured veneer between 25 and 60 cm thick overlying coarse textured, very gravelly and stony fluvioglacial deposits. Surface and subsurface textures are sandy loam or loam while subsoils are very gravelly loamy sand or very gravelly sand. These Dark Brown soils are well to rapidly drained, rapidly pervious and have slow surface runoff and moderate to low water holding capacity.

Dartmouth soils are valuable agricultural soils and most climatically adapted crops can be grown successfully. Orchards and vineyards dominate in cleared and cultivated areas. Native vegetation consists mostly of various grasses, sagebrush and rabbitbrush together with scattered Ponderosa pine.

Dartmouth soils occupy the nearly level, grassy terraces in the middle distance.

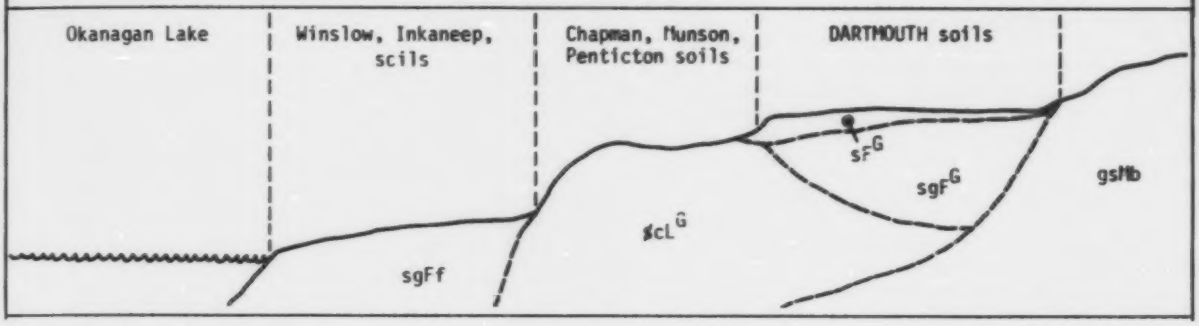
The soils are also well suited for urban and related uses. Bearing strengths are high for urban types of construction although very gravelly and stony subsoils may hinder excavations. Potential groundwater contamination is possible because of incomplete septic tank effluent filtration by the coarse-textured subsoils.

DARTMOUTH SOIL PROFILE

DEPTH (cm)		
0-	Ah or Ap	Dark grayish brown or dark brown (10YR 4/2.5), sandy loam or loam; weak to moderate, fine subangular blocky structure; very friable consistence.
25-	Bm or Bmk	Brown or dark yellowish brown (10YR 4.5/3.5), fine sandy loam; moderate, fine to medium subangular blocky structure; very friable consistence; weakly to moderately calcareous.
50-	IICk or IICca	Pale brown (10YR 5.5/2.5), very gravelly loamy sand; single-grained; loose consistence; moderately to strongly calcareous.
75-	IIC	Pale brown (10YR 5.5/2.5), very gravelly sand; single-grained; loose consistence; sometimes weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

DARTMOUTH SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	fluvioglacial deposits
DEPTH TO FREE LIME (cm)	:	35
SURFACE STONINESS CLASS	:	0
DEPTH TO WATERTABLE (m)	:	>2
PERVIOUSNESS CLASS	:	rapid
SOIL DRAINAGE CLASS	:	well to rapid
DEPTH TO ROOT RESTRICTION (cm)	:	none
TOPOGRAPHY	:	nearly level to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM	GP-GM
AASHO TEXTURE SYMBOL	A-3; A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loam	very gravelly loamy sand, very gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	moderate	very low
COARSE >7.5 cm (%)	0	20-40
FRAGMENTS <7.5 cm (%)	0-5	50-95
PASSING # 4	95-100	20-40
SIEVES (%) # 40	60-80	5-10
#200	30-70	<4

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	6.8-8.0	8.2-9.0
1:2 0.01M $CaCl_2$	6.5-7.5	7.8-9.3
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	low	low to very low
EXCHANGEABLE CATIONS - Ca	high	low
- Mg	high	low
- Na	low	low
- K	high	low
BASE SATURATION (%)	85-100	100
PHOSPHOROUS	low	low
SULFUR	medium	medium

DEBECK SOILS (DE)

GENERAL COMMENTS

Debeck soils occupy scattered locations throughout the map area, mainly near Oliver, Kaleden, Summerland and East Kelowna and are often found in association with Skaha soils. Debeck soils are typically found on strongly to steeply sloping topography although slopes range from moderate to extreme.

Debeck soils have developed in a moderately coarse textured veneer between 10 and 25 cm thick that overlies gravelly and stony fluvioglacial deposits. Surface textures are generally sandy loam, loamy sand or gravelly sandy loam. Subsurface and subsoil textures are either very gravelly loamy sand or very gravelly sand. These Rego Brown soils are rapidly drained, rapidly pervious and have low water holding capacity.

Debeck soils are restricted for agricultural use by usually adverse topography and stoniness. Cleared and cultivated areas with gentle and moderate slopes are generally planted to orchards and vineyards. The vegetation on uncleared areas commonly consists of grasses, sagebrush and rabbitbrush.

The foreground is typical of the gravelly fluvioglacial deposits on which Debeck soils occur.

Except for steeply sloping areas which are unsuited, Debeck soils are moderately suited for most urban and related uses. The soils have high bearing strength but the stony and very gravelly subsoils may hinder excavations and allow incompletely filtered septic tank effluent to reach the groundwater.

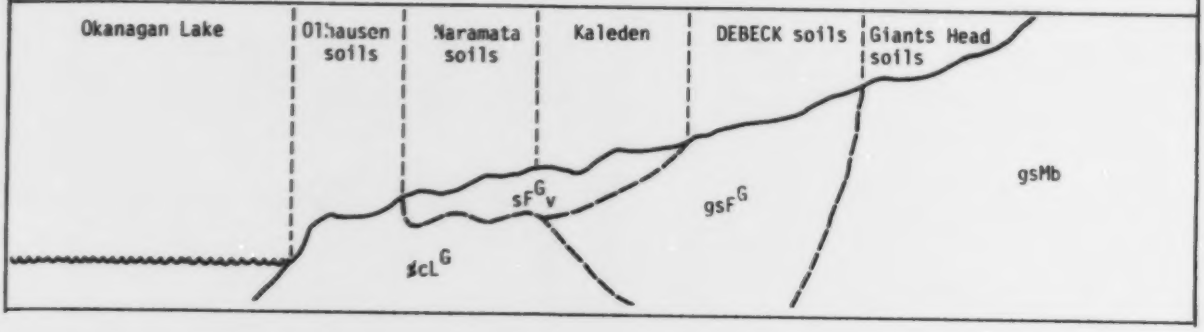
DEBECK SOIL PROFILE

DEPTH (cm)

0-	Ah, Ap, Ahk	Brown (10YR 5/3), sandy loam or loamy sand; weak to moderate, medium subangular blocky structure; soft consistence; non or weakly calcareous.
20-		
40-	IICca, IICk	Pale brown (10YR 6/3) to light gray (10YR 7/2), very gravelly loamy sand or very gravelly sand; weak, very fine subangular blocky structure grading single-grain; loose consistence; strongly calcareous in the upper part, grading to weakly calcareous at depth.
60-		

TAXONOMIC SOIL CLASSIFICATION: Rego Brown

DEBECK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 20
SURFACE STONINESS CLASS	: 0-2
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: moderate to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
UNIFIED TEXTURE SYMBOL	SM	GP-GW
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly sand, very gravelly loamy sand
PERMEABILITY	rapid	very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	0-2	20-50
FRAGMENTS <7.5 cm (%)	0-12	40-95
PASSING # 4	95-100	5-10
SIEVES (%) # 40	50-70	1-6
#200	30-50	0-3

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
SOIL REACTION (pH) 1:1 H_2O	8.0-8.4	8.3-8.8
1:2 0.01M $CaCl_2$	7.5-7.8	7.9-8.4
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	high to medium	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	low	low
- Na	low	low
- K	high	low
BASE SATURATION (%)	100	100
PHOSPHOROUS	low to medium	medium
SULFUR	low	very high

DUB LAKE SOILS (DU)

GENERAL COMMENTS

Dub Lake soils are relatively uncommon in the map area and only occur north of Oliver on extreme slopes. Parkill and Corporation soils are usually associated with Dub Lake soils.

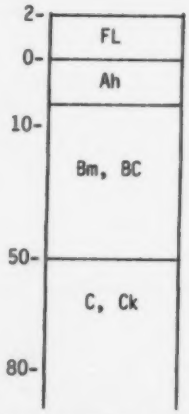
The soils have developed in gravel-free, coarse-textured fluvioglacial deposits. Solum and subsoil textures are sand or loamy sand. These Orthic Eutric Brunisol soils are rapidly drained, rapidly pervious and have very low water holding capacity.

Dub Lake soils are not suitable for agricultural or urban uses because of excessive slopes and instability and erosion hazards if the thin natural vegetation cover is disturbed. Natural vegetation consists mainly of scattered Ponderosa pine and an open grass and forb cover.

Dub Lake soils occupy the steep slopes in the middle distance.

GENERALIZED DUB LAKE SOIL PROFILE

DEPTH (cm)



FL — Loose, partially decomposed leaves and needles.

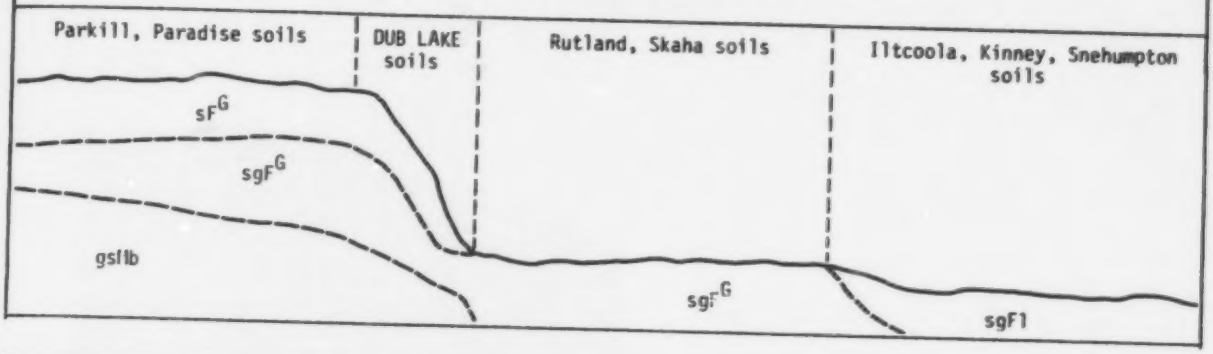
Ah — Pale brown (10YR 6/3) to brown (10YR 5.5/3), loamy sand; weak, fine subangular block structure; soft consistence.

Bm, BC — Light brownish gray or pale brown (10YR 6/2.5), loamy sand or sand; single-grain; loose consistence.

C, Ck — Light gray (10YR 7/2), sand; single-grain; loose consistence; weakly to moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Eutric Brunisol

DUB LAKE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 60
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: very strongly to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SP-SM	SP
AASHO TEXTURE SYMBOL	A-3	A-3 (A-1)
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	loamy sand or sand	sand
PERMEABILITY	very rapid	very rapid
AWSC	very low	very low
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0-5	0-5
PASSING # 4	98-100	98-100
SIEVES (%) # 40	50-75	50-80
#200	5-20	5-15

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	6.3-7.6	8.0-8.3
1:2 0.01M $CaCl_2$	6.0-7.0	7.4-7.7
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	very low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	very low	very low
EXCHANGEABLE CATIONS - Ca	low	high
- Mg	low	low
- Na	low	low
- K	low	low
BASE SATURATION (%)	95-100	100
PHOSPHOROUS	medium	medium
SULFUR	medium to moderately high	medium

EANEAS SOILS (ES)

GENERAL COMMENTS

Eaneas soils occur in scattered locations throughout the south Okanagan area from Osoyoos to Summerland. The soils occur on moderate to extreme slopes and usually occupy the upper slopes of bedrock cored ridges, knolls and hills. Giant's Head, Osoyoos and Debeck soils as well as bedrock outcrops are often closely associated with Eaneas soils.

Eaneas soils have developed in a mixture of moderately coarse textured colluvium and glacial till 10 to 100 cm thick, which overlies bedrock. Typical surface and subsurface soil texture is gravelly sandy loam; this grades to gravelly loamy sand in the subsoil. These Orthic Brown: lithic phase soils are well to rapidly drained, are rapidly pervious and have moderate to low water holding capacity.

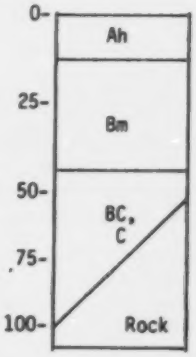
Eaneas soils are generally unsuited for agricultural uses because of steep slopes, stoniness and shallowness to bedrock. Native vegetation mostly consists of grasses, sagebrush and rabbitbrush; coniferous trees are usually absent. The soils have a low carrying capacity for livestock and are easily overgrazed.

Urban and related uses are severely constrained by steep slopes and shallowness to bedrock.

Eaneas soils and associated bedrock outcrops occupy the hill in the background.

GENERALIZED EANEAS SOIL PROFILE

DEPTH (cm)



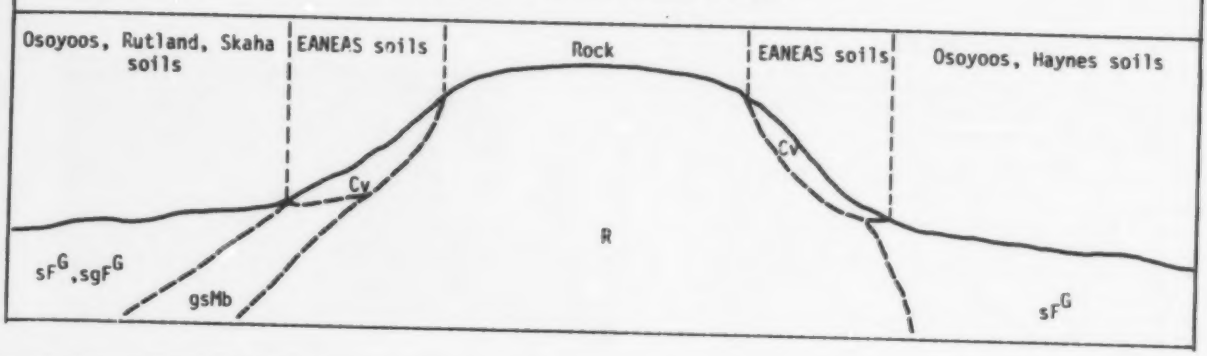
Grayish-brown or brown (10YR 5/2.5), gravelly sandy loam or gravelly loamy sand; moderate, medium, subangular blocky structure; friable consistence.

Light brownish gray (10YR 6/2), gravelly sandy loam or gravelly loamy sand; fine, medium, subangular blocky structure; friable consistence.

Pale brown to light yellowish brown (10YR 6/3.5), gravelly sandy loam or gravelly loamy sand; weak, medium, subangular blocky structure grading to single-grain; non or weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown; lithic phase

EANEAS SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: 0.1-1.0
PARENT MATERIAL	: colluvial and/or glacial till veneer over bedrock
DEPTH TO FREE LIME (cm)	: 30; variable
SURFACE STONINESS CLASS	: 0-2
DEPTH TO WATERTABLE (m)	: >1
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: 10 to 100 cm, depending on depth to bedrock
TOPOGRAPHY	: moderate to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-40 cm	40-80 cm
UNIFIED TEXTURE SYMBOL	SM	GM
AASHO TEXTURE SYMBOL	A-2-4	A-1; A-2
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	high to medium	high to medium
SOIL TEXTURE	gravelly sandy loam or gravelly loamy sand	gravelly sandy loam or gravelly loamy sand
PERMEABILITY	rapid	rapid
AWSC	low	low to very low
COARSE >7.5 cm (%)	0-10	5-25
FRAGMENTS <7.5 cm (%)	10-40	20-50
PASSING # 4	30-50	30-50
SIEVES (%) # 40	20-35	20-35
#200	15-25	15-25

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-40 cm	40-80 cm
SOIL REACTION (pH) 1:1 H_2O	6.8-7.8	7.6-8.6
1:2 0.01M $CaCl_2$	6.2-7.4	7.2-8.2
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate to low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low
- K	medium	medium
BASE SATURATION (%)	98-100	100
PHOSPHOROUS	low	low
SULFUR	low	low

ELLISON SOILS (EN)

GENERAL COMMENTS

Ellison soils occupy a relatively minor area near the south end of Ellison Lake on gentle and moderate slopes.

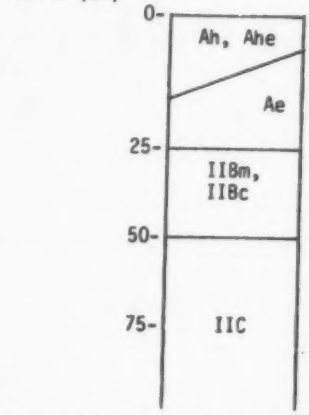
The soils have developed in gravelly, coarse-textured fluvioglacial deposits which have a 10 to 25 cm capping of sandy material. Surface textures are sandy loam or loamy sand underlain by very gravelly sand or very gravelly loamy sand. Stones and cobbles are common in the subsoil. The soils are rapidly drained and rapidly pervious, have slow surface runoff and low water holding capacity. Soil classification is Eluviated Dark Brown.

Ellison soils are limited for agricultural use by excessive subsoil stoniness, low water holding capacity and, sometimes adverse topography. Most areas are still uncleared and support Ponderosa pine, grasses in the understory, and scattered Douglas-fir. Small cleared areas are used for pasture and hay.

Typical native vegetation on Ellison soils.

The soils have high bearing strengths for urban types of construction although excessive stoniness may make excavation difficult. Incomplete filtration of septic effluent by the coarse subsoil may lead to contamination of groundwater.

ELLISON SOIL PROFILE



Dark grayish brown (10YR 4.5/2), sandy loam or loamy sand; weak to moderate, fine, granular structure; very friable consistence.

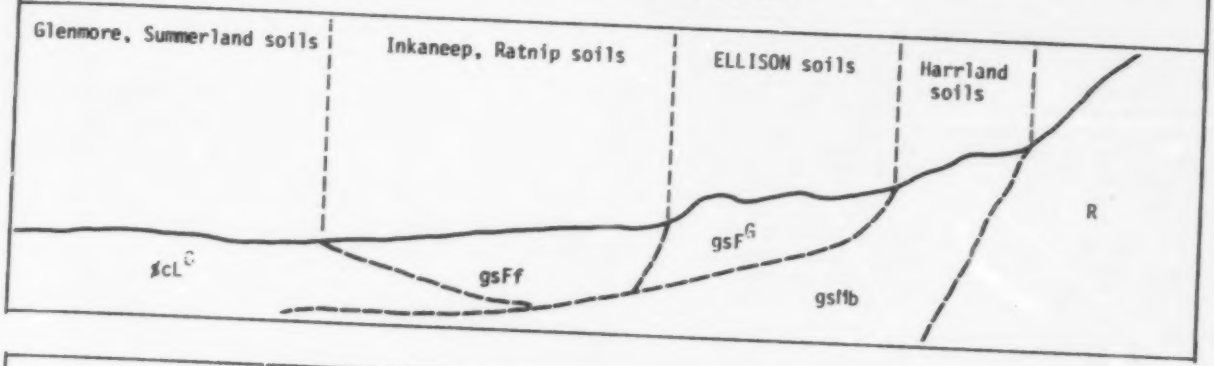
Pale brown (10YR 6/3), sandy loam or loamy sand; weak, very fine, subangular blocky structure; very friable consistence.

Light yellowish brown (10YR 5.5/6) to yellowish-brown (10YR 5/4), gravelly loamy sand or very gravelly sand; weak, very fine, subangular blocky structure, or single-grain; loose consistence.

Very pale brown to yellowish-brown (10YR 6/4), very gravelly sand; single-grain; loose consistence; non or weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Dark Brown

ELLISON SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0-2
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid to well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle and moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
UNIFIED TEXTURE SYMBOL	ML-SM	GP-GM
AASHO TEXTURE SYMBOL	A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly loamy sand, very gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	0-5	5-15
FRAGMENTS <7.5 cm (%)	0-15	55-90
PASSING # 4	10-30	15-25
SIEVES (%) # 40	5-15	10-15
#200	<5	1-5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
SOIL REACTION (pH) 1:1 H_2O	6.5-6.8	6.6-7.0
1:2 0.01M $CaCl_2$	6.0-6.3	6.1-6.6
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to moderate	low to very low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	medium
- Na	very low	very low
- K	high	low
BASE SATURATION (%)	50-70	85-100
PHOSPHOROUS	low	low
SULFUR	low	low

FAULDER SOILS (FR)

GENERAL COMMENTS

Faulder soils are scattered throughout the central part of the Okanagan map area. They occur on moderate to extreme slopes usually in association with Kelowna, Valley Creek and Munson soils, and bedrock outcrops.

Faulder soils have developed in moderately coarse textured, stony colluvium or glacial till, between 10 and 100 cm thick, overlying bedrock.

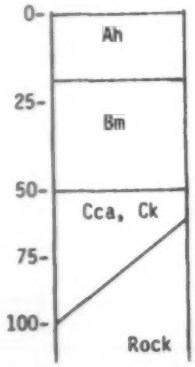
These Orthic Dark Brown: lithic phase soils are well to rapidly drained, rapidly pervious and have low to moderate water holding capacity. Surface and subsurface textures are usually gravelly sandy loam (sometimes gravelly loam) and grade to very gravelly sandy loam in the subsoil.

Faulder soils are severely constrained for both agricultural and urban uses by steep slopes, stoniness and shallowness to bedrock. Natural vegetation consists of grasses, sagebrush, rabbitbrush and scattered Ponderosa pine. Limited natural grazing is available.

Typical landscape showing the shallow Faulder soils intermixed with bedrock outcrops.

GENERALIZED FAULDER SOIL PROFILE

DEPTH (cm)



Grayish dark brown or brown (10YR 4/2.5), gravelly loam or gravelly sandy loam; weak to moderate, medium, granular structure; very friable consistence.

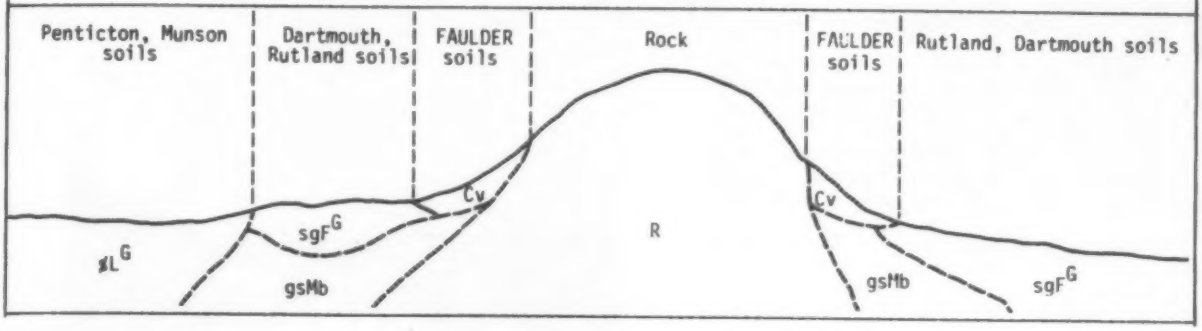
Brown (10YR 5/3), gravelly sandy loam; weak to moderate, fine, subangular blocky structure; friable consistence.

Light gray to pale brown (10YR 6.5/2.5), gravelly loamy sand or gravelly sandy loam; weak to moderate subangular blocky structure; soft to slightly hard consistence; strongly calcareous.

Bedrock, moderately weathered and fractured.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown; lithic phase

FAULDER SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	0.1-1.0
PARENT MATERIAL	:	colluvial or glacial till veneer over bedrock
DEPTH TO FREE LIME (cm)	:	45
SURFACE STONINESS CLASS	:	0-2
DEPTH TO WATERTABLE (m)	:	>1
PERVIOUSNESS CLASS	:	rapid
SOIL DRAINAGE CLASS	:	well to rapid
DEPTH TO ROOT RESTRICTION (cm)	:	10 to 100 cm, depending on depth to bedrock
TOPOGRAPHY	:	moderate to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	50-80 cm
UNIFIED TEXTURE SYMBOL	SM, ML	GM, GC
AASHO TEXTURE SYMBOL	A-4; A-2-4	A-1; A-2
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	high to medium	high to medium
SOIL TEXTURE	gravelly sandy loam, gravelly loam	gravelly sandy loam
PERMEABILITY	rapid	rapid
AWSC	low to moderate	low
COARSE >7.5 cm (%)	0-5	0-8
FRAGMENTS <7.5 cm (%)	20-50	20-50
PASSING # 4	80-100	15-35
SIEVES (%) # 40	20-50	5-15
#200	10-20	<8

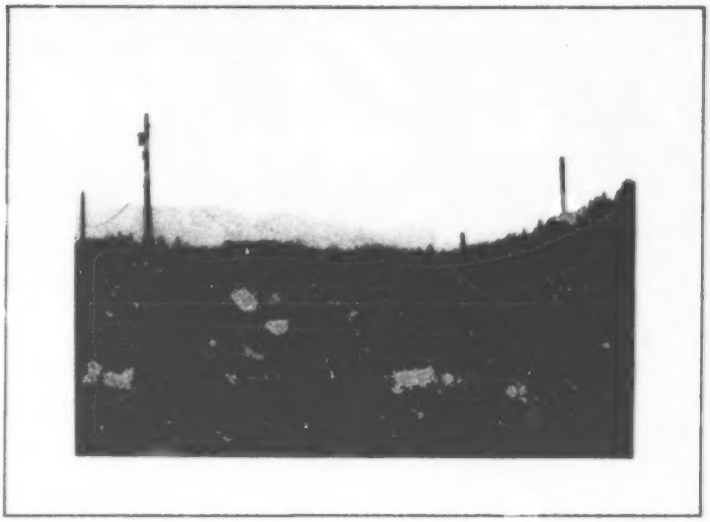
CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	50-80 cm
SOIL REACTION (pH) 1:1 H_2O	7.3-7.8	8.0-8.6
1:2 0.01M $CaCl_2$	6.8-7.3	7.5-8.2
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to moderate	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium	low to medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low
- K	medium	low
BASE SATURATION (%)	95-100	100
PHOSPHOROUS	medium	medium
SULFUR	low	low

GAMMIL SOILS (GM)

GENERAL COMMENTS

Gammil soils are relatively common in the Okanagan Valley between Vaseaux Lake to Ellison Lake where they are often closely associated with Parkill, Paradise and Trout Creek soils. The topography ranges from very gently to extremely sloping. Along escarpments the slopes are greater than 60%.

The parent materials of Gammil soils are deep, coarse-textured, stony and gravelly fluvioglacial deposits, capped by 10 to 25 cm of sandy materials. Surface textures are gravelly sandy loam, sandy loam or loamy sand while subsurface and subsoil textures vary from very gravelly loamy sand to gravelly sand. These Eluviated Eutric Brunisol soils are rapidly drained, rapidly pervious and have low water holding capacity and slow surface runoff.



A typical area of Gammil soils. Note surface stoniness.

Gammil soils are limited for agricultural uses by stoniness, low water holding capacity and in some areas adverse topography. Areas with gentle slopes are generally cleared and cultivated to either tree fruits, vineyards or are used for pasture and hay production. Natural vegetation consists mainly of Ponderosa pine, Douglas-fir, bunchgrass and shrubs with moss on north-facing exposures.

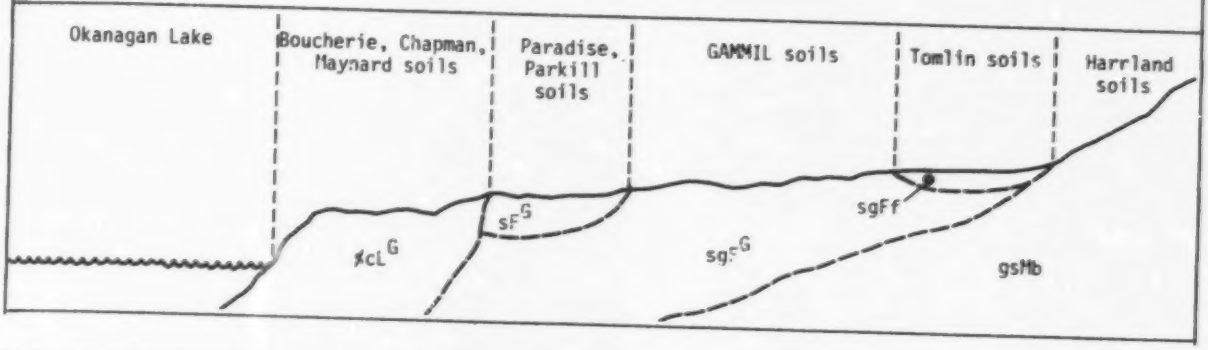
The less steeply sloping areas of Gammil soils are moderately suited for urban and related uses although subsoil stoniness may interfere with excavating. The coarse subsoils may also provide incomplete filtration of septic tank effluent.

GENERALIZED GAMMIL SOIL PROFILE

DEPTH (cm)		
5-	FL	Loose, partially decomposed to raw needles, leaves and other forest litter.
0-	Ae, Ahe	Grayish-brown (10YR 5/2), sandy loam, loamy sand or gravelly loamy sand; weak to moderate, fine, granular structure; slightly hard consistence.
25-	IIBm	Yellowish-brown (10YR 5/4) to dark yellowish brown (10YR 4.5/5), gravelly loamy sand or very gravelly sand; moderate, medium subangular blocky structure; slightly hard consistence.
50-	IIC, IICk	Pale brown (10YR 6/3), very gravelly sand or very gravelly loamy sand; single-grain; loose consistence.
75-		

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

GAMMILL SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >120
SURFACE STONINESS CLASS	: 1-3
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
UNIFIED TEXTURE SYMBOL	SM, SW	GP, GM
AASHO TEXTURE SYMBOL	A-3	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium to high	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly loamy sand, gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	5	10-30
FRAGMENTS <7.5 cm (%)	5-15	25-60
PASSING # 4	50-80	40-60
SIEVES (%) # 40	4-10	4-10
#200	<5	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
SOIL REACTION (pH) 1:1 H_2O	6.0-7.0	6.6-7.6
1:2 0.01M $CaCl_2$	5.6-6.5	6.1-7.2
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	medium to low	low to very low
EXCHANGEABLE CATIONS - Ca	medium	medium
- Mg	medium	medium
- Na	low	low
- K	moderately high to high	medium
BASE SATURATION (%)	60-85	85-100
PHOSPHOROUS	medium	low
SULFUR	low	low

GARTRELL SOILS (GR)

GENERAL COMMENTS

Gartrell soils occur in a few scattered areas throughout the Okanagan Valley portion of the map area. Topographically the soils occupy level to depressional areas or seepage locations among Rutland, Skaha and Osoyoos soils.

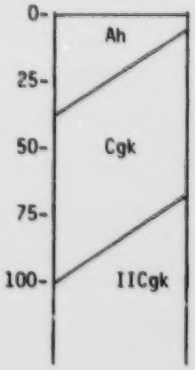
The soils have developed in a medium-textured, mainly stone-free veneer, between 60 and 100 cm thick, overlying gravelly, coarse-textured fluvioglacial deposits. Surface and subsurface textures are loam or sandy loam while subsoil textures are gravelly loamy sand or gravelly sandy loam. Gartrell soils are mostly poorly drained although some higher-lying, imperfectly drained areas are also included. These Rego Humic Gleysol: calcareous phase soils are moderately pervious, have a moderate water holding capacity and slow surface runoff.

Gartrell soils are severely limited for agricultural uses if they are not artificially drained. If adequately drained most crops which rae not unduly sensitive to wet conditions can successfully be grown. Natural vegetation consists of reeds, sedges, grasses and other hydrophytic vegetation.

Urban uses are severely constrained by poor drainage and high water tables.

Gartrell soils occupy the depressional area near the center of the photo.

GENERALIZED GARTRELL SOIL PROFILE



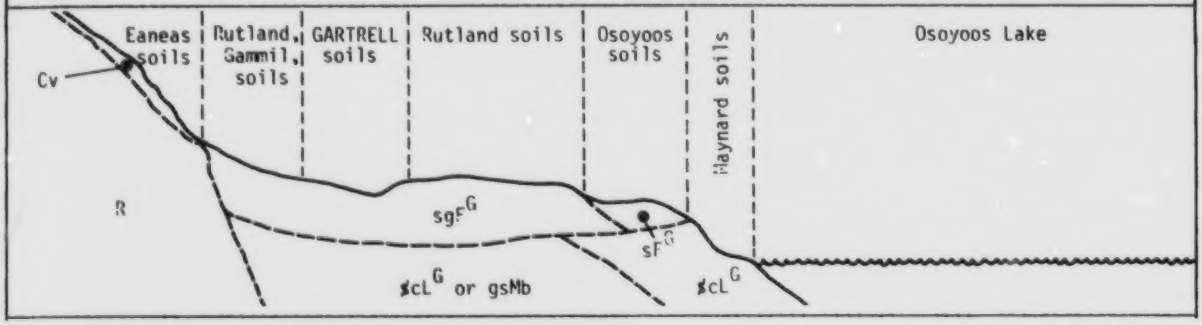
Dark grayish brown (10YR 4.5/2), sandy loam or loam; weak to moderate, fine granular structure; friable consistence; slightly calcareous.

Brown (10YR 4.5/3.5), sandy loam, loam or sometimes gravelly sandy loam; weak to moderate, fine subangular blocky structure; friable or firm consistence; moderately calcareous; common, medium, distinct mottles.

Yellowish-brown (10YR 4.5/4), gravelly loamy sand or gravelly sandy loam; weak, subangular blocky structure; very friable consistence; weakly saline and moderately calcareous; common, medium, prominent mottles.

TAXONOMIC SOIL CLASSIFICATION: Rego Humic Gleysol; calcareous phase

GARTRELL SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	fluvioglacial deposits
DEPTH TO FREE LIME (cm)	:	15
SURFACE STONINESS CLASS	:	0-1
DEPTH TO WATERTABLE (m)	:	varies from 30 to 150 cm throughout the year
PERVIOUSNESS CLASS	:	moderate
SOIL DRAINAGE CLASS	:	poor to imperfect
DEPTH TO ROOT RESTRICTION (cm)	:	80; water table
TOPOGRAPHY	:	nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-70 cm	>70 cm
UNIFIED TEXTURE SYMBOL	SM, SC	GW, SW
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loam, or gravelly sandy loam	gravelly sandy loam, gravelly loamy sand
PERMEABILITY	moderate	rapid
AWSC	moderate	low to very low
COARSE >7.5 cm (%)	0-5	10-20
FRAGMENTS <7.5 cm (%)	5-50	25-50
PASSING # 4	80-100	70-90
SIEVES (%) # 40	75-95	10-40
#200	25-40	<10

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-70 cm	>70 cm
SOIL REACTION (pH) 1:1 H_2O	7.4-8.2	8.0-8.8
1:2 0.01M $CaCl_2$	7.1-7.8	7.5-8.3
SALINITY CLASS	weakly saline	weakly saline
ORGANIC CARBON	low to moderate	very low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium	low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	medium	high
- K	medium	medium
BASE SATURATION (%)	100	100
PHOSPHOROUS	medium	medium
SULFUR	medium	medium

GELLATLY SOILS (GY)

GENERAL COMMENTS

Gellatly soils occur in the vicinity of Westbank and north of Kelowna within the Glenmore Valley where they occupy gentle to strong slopes, usually in association with Glenmore, Lambly, Westbank and Munson soils.

Gellatly soils have developed in a moderately coarse to medium textured fluvial or fluvioglacial veneer between 10 and 50 cm thick overlying silty glaciolacustrine sediments. Surface and subsurface textures vary from loam to sandy loam. Subsoil textures are mainly stratified silt loam or silty clay loam. These Eluviated Eutric Brunisol soils are well drained, moderately pervious and have a high water holding capacity.

Uncleared areas support various grasses, sagebrush and Ponderosa pine.

An area typical of the Gellatly soils being used for alfalfa production.

Gellatly soils are suited for many agricultural crops. They are well drained, have a high water holding capacity, are fertile and have an unrestricted rooting depth to at least 75 cm. Strongly sloping topography in some areas may be somewhat limiting. Cleared and cultivated areas are currently either planted to orchards and vineyards or used for forage crops and hay production.

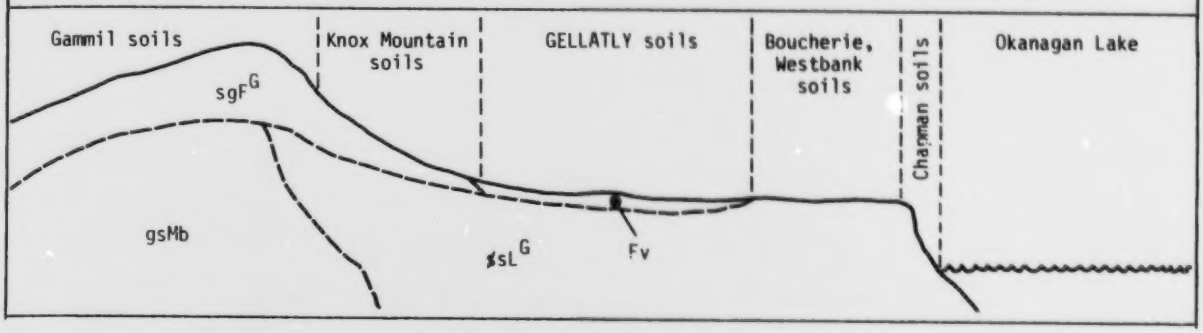
Gellatly soils are moderately suited for urban and related uses. Low bearing strength, high shrink-swell potential and moderately fine subsoil textures are some of the constraints for this use. Septic tank effluent disposal may be moderately restricting by the compact subsoil.

GENERALIZED GELLATLY SOIL PROFILE

DEPTH (cm)		
0-	Ahe, Ap	Grayish-brown (10YR 5/2), sandy loam or loam; weak, medium platy, breaking into weak, medium granular structure; very friable consistence.
25-	Ae	Light brownish gray (10YR 5.5/2), very fine sandy loam or loam; weak, medium subangular blocky structure; friable consistence.
50-	Bm, Btj	Brown or pale brown (10YR 5.5/3) silt loam, silty clay loam or clay loam; moderate to strong, fine or medium subangular blocky structure; firm consistence.
75-	Cca, Ck	Pale brown to light gray (10YR 6.5/2), silt loam or silty clay loam; moderate to strong pseudo-platy, breaking to moderate, medium angular blocky structure; firm consistence; moderately to strongly calcareous.
100-		

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

GELLATLY SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	fluvial or fluvioglacial veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	:	55
SURFACE STONINESS CLASS	:	0
DEPTH TO WATERTABLE (m)	:	>2
PERVIOUSNESS CLASS	:	moderate
SOIL DRAINAGE CLASS	:	well
DEPTH TO ROOT RESTRICTION (cm)	:	50; compact subsoil
TOPOGRAPHY	:	very gentle to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	ML	CL, ML
AASHO TEXTURE SYMBOL	A-4	A-7; A-4
LIQUID LIMIT	25-35	35-45
PLASTICITY INDEX	10-15	10-25
SHEAR STRENGTH	medium to low	low to medium
SOIL TEXTURE	loam, sandy loam	silt loam or silty clay loam
PERMEABILITY	moderate	slow to moderate
AWSC	high	high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0-5	0
PASSING # 4	100	100
SIEVES (%) # 40	95-100	100
#200	25-50	95-100

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	6.7-7.2	7.3-8.5
1:2 0.01M $CaCl_2$	6.2-6.7	6.9-8.1
SALINITY CLASS	non-saline	very weakly to weakly saline
ORGANIC CARBON	low to moderate	very low
NITROGEN	low	very low
EXCHANGE CAPACITY	high	medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low to medium
- K	high	high
BASE SATURATION (%)	90-100	100
PHOSPHOROUS	moderately high	high
SULFUR	low to medium	very high

GIANTS HEAD SOILS (GH)

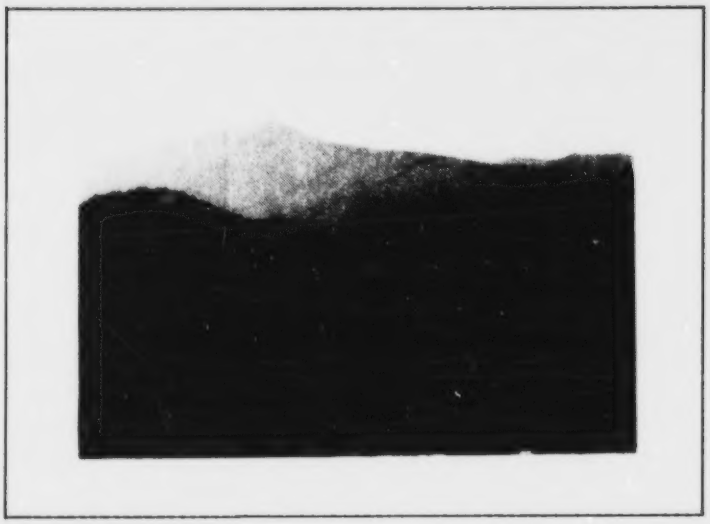
GENERAL COMMENTS

Giants Head soils are relatively common in the southern and central portions of the map area. The soils occur on gentle to extreme slopes, usually in association with Skaha, Eaneas, Stemwinder and Debeck soils.

The parent material of these Orthic Brown soils consists of a sandy eolian veneer, between 10 and 30 cm thick, overlying medium to moderately coarse-textured glacial till. Surface textures are sandy loam or loamy sand, changing to gravelly sandy loam or gravelly loam in the glacial till subsurface and subsoil. The soils are well drained, moderately pervious, have moderate surface runoff and moderate water holding capacity.

Giants Head soils are good agricultural soils but adverse topography limits their use. A few gentle sloping areas are cleared and cultivated to tree fruits and hay and alfalfa production. Native vegetation consists of scattered Ponderosa pine, sagebrush, rabbitbrush and bunch grass.

Urban and similar uses are usually moderately suited for these soils. Soil bearing strengths are good although adverse topography is constraining in some areas.



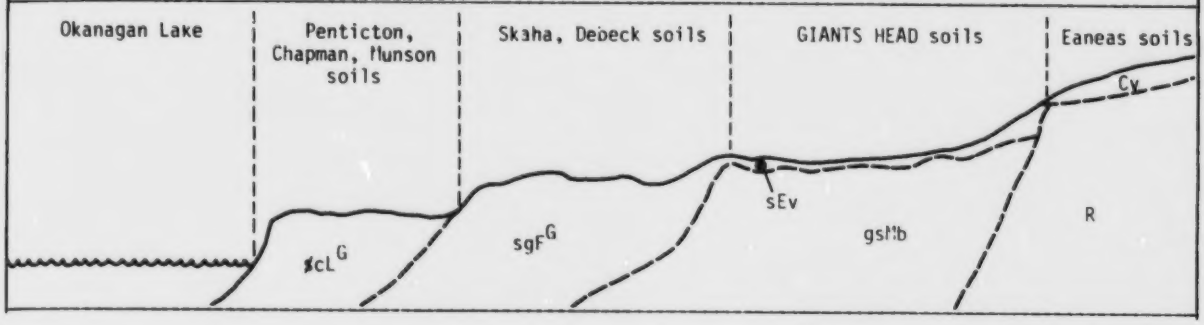
A typical area of Giants Head soils near Nighthawk.

GENERALIZED GIANTS HEAD SOIL PROFILE

DEPTH (cm)		
0-	Ah, Ahe	Grayish-brown (10YR 5/2), sandy loam or loamy sand; very weak, medium, prismatic breaking to weak, fine granular structure; very friable consistence.
25-	IIBtj,IIBm, IIBt	Pale brown (10YR 6/3) or light brownish gray (2.5Y 6.5/2), gravelly loam or gravelly sandy loam; moderate to strong, coarse, subangular blocky structure; extremely hard consistence.
50-	IIBC, IIBCk	Pale brown (10YR 6/3), gravelly sandy loam; moderate to strong, coarse subangular blocky structure; hard to very hard consistence; slightly calcareous.
75-		
100-	IICk	Light brownish gray (2.5Y 6/2), gravelly sandy loam or gravelly loam; moderate, medium, pseudo-platy breaking to moderate, very fine angular blocky structure; firm consistence; strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

GIANTS HEAD SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: eolian veneer over glacial till
DEPTH TO FREE LIME (cm)	: 55
SURFACE STONINESS CLASS	: 0-2
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: 80; moderately compacted subsoil
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM, SC	SM, GM	GM, GC
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-2-4; (A-4)	A-2-4
LIQUID LIMIT	10-20	10-20	10-20
PLASTICITY INDEX	1-6	1-6	1-6
SHEAR STRENGTH	high to medium	high to medium	high to medium
SOIL TEXTURE	sandy loam, loamy sand	gravelly sandy loam, gravelly loam,	gravelly sandy loam
PERMEABILITY	moderate	moderate	moderate to slow
AWSC	moderate	low to moderate	low
COARSE >7.5 cm (%)	0	0-5	5-15
FRAGMENTS <7.5 cm (%)	0-5	20-40	20-60
PASSING # 4	90-100	90-100	80-90
SIEVES (%) # 40	75-90	75-90	60-80
#200	20-50	20-50	<20

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.6-7.4	7.0-8.0	8.4-8.8
1:2 0.01M $CaCl_2$	6.1-7.0	6.5-7.6	8.0-8.4
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	low to moderate	low	very low
NITROGEN	low	very low	very low
EXCHANGE CAPACITY	medium	low	low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	very low	very low to low	medium
- K	high	high to very high	low
BASE SATURATION (%)	95-100	95-100	100
PHOSPHOROUS	variable	variable	very low
SULFUR	low to medium	low	low

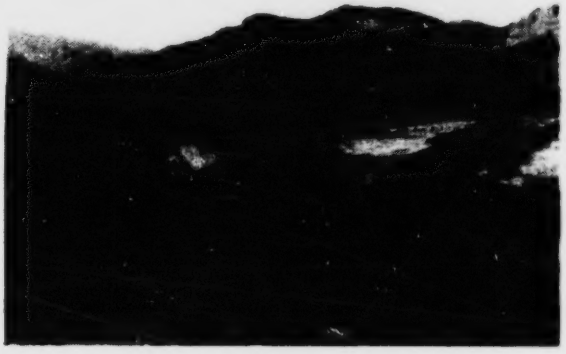
GILLANDERS SOILS (GS)

GENERAL COMMENTS

Gillanders soils occur only on the eastern side of the Similkameen River floodplain south of Cawston where they occupy very gently sloping depressions in the landscape. Chopaka and Cawston soils are usually closely associated with Gillanders soils, either as components in soil complexes or occuping adjacent areas.

Gillanders soils have developed in deep, medium and moderately fine textured, very calcareous and moderately saline fluvial floodplain deposits. Surface and subsurface textures are silt loam or silty clay loam while subsoils are silty clay loam.

These Rego Humic Gleysol: calcareous and saline phased soils are poorly to very poorly drained. They are slowly pervious, have high water storage capacity and slow surface runoff. Surface ponding is common and the fluctuating water table is usually within 1 meter of the surface.



Gillanders soils occupy the gentle undulating areas in the vicinity of the fence.

Gillanders soils are severely limited for agricultural use by high water tables, surface ponding and high levels of lime and salinity. Cleared areas are currently used for pasture and hay. Natural vegetation consists of willows, sedges, reeds, cattails, as well as lime and salt tolerant grasses.

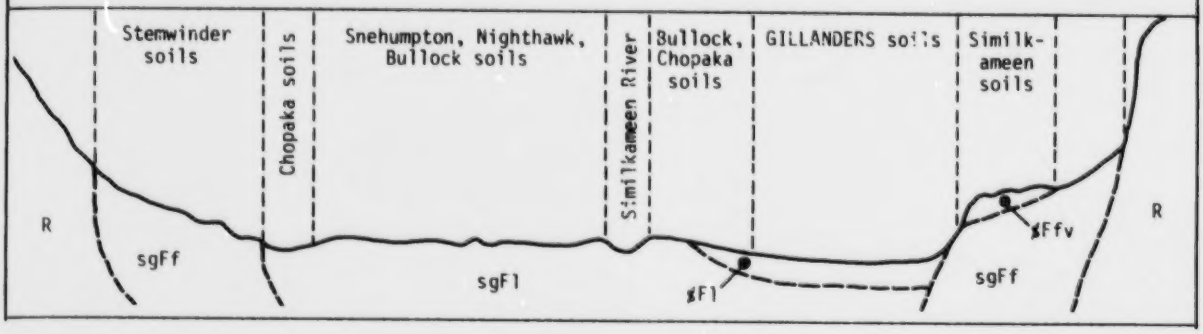
Urban and related uses are not recommended. Poor drainage and high water tables make road and building construction difficult and expensive. Septic tank effluent disposal is impractical due to high water tables and slowly pervious subsoils.

GENERALIZED GILLANDERS SOIL PROFILE

DEPTH (cm)		
0-	Ahk, Ahsk	Very dark gray (10YR 3/1.5), silt loam; moderate, medium, granular structure; friable consistence; strongly calcareous; moderately saline.
25-	Cgk, Cgca Cgsk	Dark gray (5Y 4/1), silt loam or silty clay loam; moderate, medium, blocky structure; friable consistence; strongly calcareous; weakly saline.
50-		
75-	Cgk	Gray or light gray (5Y 5.5/1), silty clay loam; moderate, very fine, subangular blocky structure; very firm and slightly sticky consistence; strongly calcareous; very weakly saline.

TAXONOMIC SOIL CLASSIFICATION: Rego Humic Gleysol; calcareous and saline phases

GILLANDERS SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	:	0
SURFACE STONINESS CLASS	:	0
DEPTH TO WATERTABLE (m)	:	<1 m
PERVIOUSNESS CLASS	:	slow
SOIL DRAINAGE CLASS	:	poor to very poor
DEPTH TO ROOT RESTRICTION (cm)	:	50; high water tables and high lime levels
TOPOGRAPHY	:	nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
UNIFIED TEXTURE SYMBOL	ML-CL	CL, ML
AASHO TEXTURE SYMBOL	A-4, A-6	A-6
LIQUID LIMIT	30-35	40-60
PLASTICITY INDEX	10-15	15-25
SHEAR STRENGTH	medium to low	medium to low
SOIL TEXTURE	silt loam, silty clay loam	silty clay loam, silt loam
PERMEABILITY	moderate to slow	slow to very slow
AWSC	high	high
COARSE FRAGMENTS >7.5 cm (%)	0	0
<7.5 cm (%)	0	0
PASSING # 4	100	100
SIEVES (%) # 40	90-100	95-100
#200	50-80	85-95

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
SOIL REACTION (pH) 1:1 H_2O	7.4-8.0	7.9-8.5
1:2 0.01M $CaCl_2$	7.0-7.5	7.5-8.2
SALINITY CLASS	moderately saline	weakly to moderately saline
ORGANIC CARBON	moderately high	moderate to low
NITROGEN	medium to low	low
EXCHANGE CAPACITY	medium	medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	medium	low
- K	very high	high
BASE SATURATION (%)	100	100
PHOSPHOROUS	low	low
SULFUR	very high	very high

GLENFIR SOILS (GF)

GENERAL COMMENTS

Glenfir soils are found in the Inkaneep Valley near Oliver and at Okanagan Falls where they occupy nearly level to strong slopes, usually in association with Burnell Lake, Similkameen and Hayman soils.

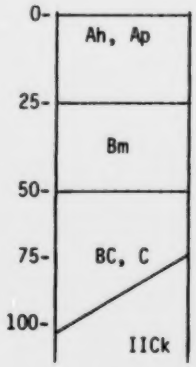
These Orthic Brown soils have developed in sandy fluvial fan deposits which become gravelly with depth. Surface and subsurface textures are loamy sand or sandy loam and grade to very gravelly sand in the subsoil. Glenfir soils are well to rapidly drained, rapidly pervious, have slow surface runoff and low water holding capacity.

The main agricultural limitation of Glenfir soils is low water holding capacity and, in some areas, adverse topography. Most areas are cleared and used for tree fruits, forages or intensive vegetable production. Uncleared areas support sagebrush, rabbitbrush, grasses in the understory and scattered Ponderosa pine.

The soils are generally well suited for urban uses although incomplete septic tank effluent filtration may occur due to the coarse-textured subsoil.

The foreground is typical of uncleared Glenfir soils in the Inkaneep Valley.

GENERALIZED GLENFIR SOIL PROFILE



Brown (10YR 5/3), sandy loam or loamy sand; weak, fine, subangular blocky structure; soft or slightly hard consistence.

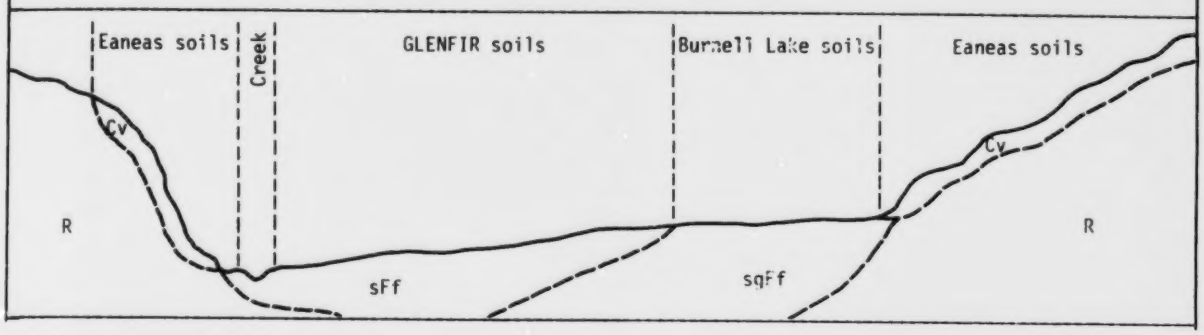
Brown (10YR 5.5/3), loamy sand; weak, coarse, prismatic breaking into weak, fine, subangular blocky structure; very friable consistence.

Pale brown (10YR 6/3), loamy sand; weak, angular blocky structure breaking to single-grain; weakly calcareous.

Yellowish-brown (10YR 5/4), gravelly loamy sand or very gravelly sand; single-grain; loose consistence; weakly to moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

GLENFIR SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: 90
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM-SP	SM-SP	GP, GW
AASHO TEXTURE SYMBOL	A-3; A-2-4	A-3; A-2-4	A-1
LIQUID LIMIT	NP	NP	NP
PLASTICITY INDEX	NP	NP	NP
SHEAR STRENGTH	medium	medium	high to medium
SOIL TEXTURE	sandy loam, loamy sand	loamy sand	gravelly loamy sand or very gravelly sand
PERMEABILITY	rapid	rapid	very rapid
AWSC	low	low	low to very low
COARSE >7.5 cm (%)	0	0-5	5-15
FRAGMENTS <7.5 cm (%)	0	0-5	50-75
PASSING # 4	100	90-100	40-75
SIEVES (%) # 40	60-70	40-60	5-15
#200	5-10	5-10	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.5-7.3	7.0-7.5	8.0-8.5
1:2 0.01M $CaCl_2$	6.0-6.8	6.5-7.1	7.6-8.1
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	low	very low	very low
NITROGEN	low	very low	very low
EXCHANGE CAPACITY	low	very low	very low
EXCHANGEABLE CATIONS - Ca	high	high	medium to high
- Mg	medium	medium	medium
- Na	very low	very low	very low
- K	high	high	high
BASE SATURATION (%)	70-95	90-100	100
PHOSPHOROUS	low to medium	low to medium	low to medium
SULFUR	low	low	low

GLENMORE SOILS (GL)

GENERAL COMMENTS

Glenmore soils occur mainly in the Glenmore Valley north of Kelowna, and near Ellison, Westbank and Okanagan Mission. They occupy nearly level to moderate slopes in association with Westbank, Summerland, Greata, Gellatly and McKinley soils.

Glenmore soils have developed in moderately fine to fine textured, stone-free glaciolacustrine deposits. Surface and subsurface textures are mainly silty clay loam or clay loamy while subsoils are silty clay with variations to clay or silty clay loam. Sandy or gravelly lenses are sometimes present at depths greater than 2 metres.

Soil classification is mostly Eluviated Dark Brown although Orthic Gray Luvisols may also occur on some north-facing slopes. The soils are generally well to moderately well drained, slowly pervious, have high water holding capacity and moderate surface runoff. Temporary perched groundwater tables may occur during snowmelt or after excessive irrigation due to the slowly pervious subsoil.

Glenmore soils occupy the central part of the photo. Knox Mountain soils occupy the sloping foreground.

Glenmore soils are moderately well suited for most agricultural crops. The have good water holding capacity, are stone-free and relatively fertile. Most areas are cleared and cultivated to either pasture, hay or tree fruit production. Uncleared areas support scattered Ponderosa pine with grasses in the understory.

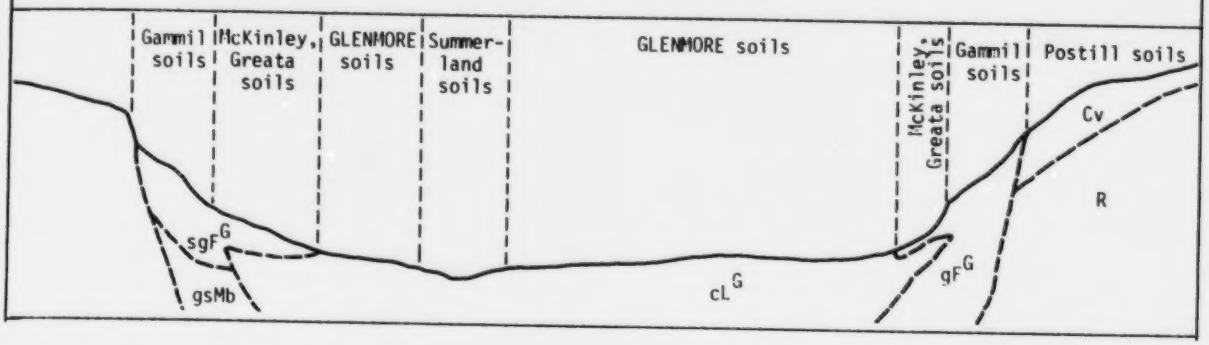
Urban uses are limited by variable bearing strengths that may require special foundation construction and poor workability of the soil when wet. Slow subsoil permeability retards efficient operation of septic tank disposal fields.

GENERALIZED GLENMORE SOIL PROFILE

DEPTH (cm)		
0-	Ap, Ah	Grayish-brown (10YR 5/2), silty clay loam; moderate to strong, fine, angular blocky structure; friable to firm consistence.
25-	Ae	Light brownish gray (10YR 5.5/2), silt loam or silty clay loam; moderate, medium, platy structure; firm consistence.
	Bt, BC	Grayish-brown or brown (10YR 5/2.5), silty clay or clay; moderate, medium prismatic breaking to strong, medium, subangular blocky structure; hard to very hard consistence.
50-		
	Ck	Light gray (5Y 7/2), clay; strong, fine, pseudo-platy structure; very hard consistence; strongly calcareous.
75-		

TAXONOMIC SOIL CLASSIFICATION: Eluviated Dark Brown

GLENMORE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 55
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: slow
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 30; clay accumulation layer
TOPOGRAPHY	: nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
UNIFIED TEXTURE SYMBOL	MH, ML	MH
AASHO TEXTURE SYMBOL	A-7	A-7
LIQUID LIMIT	30-55	50-65
PLASTICITY INDEX	11-30	20-35
SHEAR STRENGTH	medium to low	medium to low
SOIL TEXTURE	silty clay loam	silty clay, clay or clay loam
PERMEABILITY	slow	very slow
AWSC	high	high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0
PASSING # 4	100	100
SIEVES (%) # 40	100	100
#200	99	99

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
SOIL REACTION (pH) 1:1 H_2O	7.0-7.4	7.2-8.2
1:2 0.01M $CaCl_2$	6.6-7.0	6.8-7.6
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate	low to very low
NITROGEN	medium	low to very low
EXCHANGE CAPACITY	high	high
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	high
- K	high	high to very high
BASE SATURATION (%)	90-100	very low
PHOSPHOROUS	high	100
SULFUR	low to medium	high
		low

GREATA SOILS (GT)

GENERAL COMMENTS

Greata soils occupy scattered areas near Peachland, Westbank and Okanagan Mission and occur on gentle to extreme slopes in association with Chapman, Boucherie, Gammil and Gellatly soils.

Greata soils have developed in a gravelly, moderately coarse-textured fluvioglacial veneer, between 60 and 100 cm thick, overlying calcareous, moderately fine textured glaciolacustrine sediments. Surface and subsurface textures are gravelly sandy loam or gravelly loam where the subsoil is silty clay loam or silt loam. These Eluviated Dark Brown soils are well drained, moderately to slowly pervious and have a moderate to high water holding capacity.

Greata soils are generally moderately well suited for agricultural crops although in some areas adverse slopes and surface stoniness may be limiting. Cleared areas are mainly planted to orchards and vineyards. Natural vegetation consists of Ponderosa pine, sagebrush, rabbitbrush and grasses in the understory.

Greata soils occupy the sloping areas to the right of the highway.

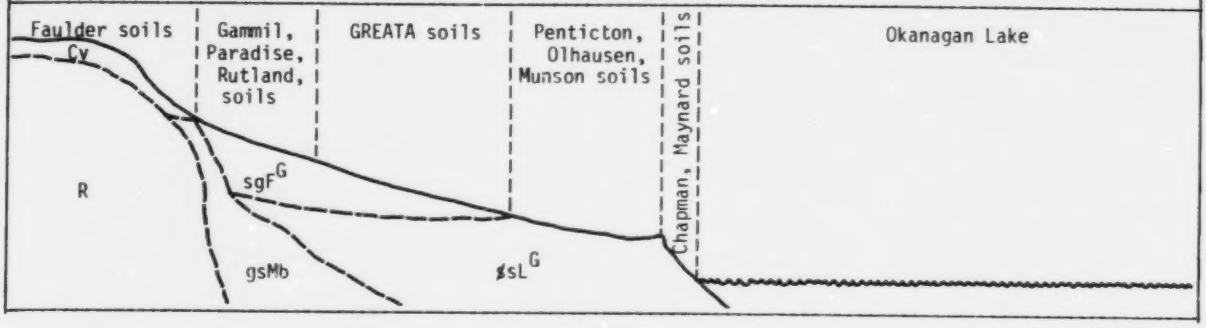
Greata soils are moderately suited for urban or similar uses. Variable bearing strengths and high shrink-swell potential may require special foundation considerations. Septic tank effluent disposal may be constrained by the low subsoil permeability.

GENERALIZED GREATA SOIL PROFILE

DEPTH (cm)		
0-	Ap, Ah	Grayish-brown (10YR 4.5/2) to brown (10YR 5/2.5), gravelly sandy loam or gravelly loam; moderate, medium, platy breaking to medium, very fine, subangular blocky structure; slightly hard consistence.
25-	Ae	Pale brown (10YR 5.5/3), gravelly sandy loam; weak to moderate, fine subangular blocky structure; hard consistence.
50-	Bm, Bt	Brown (10YR 5.5/3), gravelly loam or gravelly silt loam; moderate, very fine, prismatic breaking to moderate, medium, subangular blocky structure; firm consistence.
75-		
100-	IICk, IICca	Light gray (10YR 7/1.5), silt loam or silty clay loam; moderate, very fine, angular blocky structure; friable to firm consistence; strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Dark Brown

GREATA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 75
SURFACE STONINESS CLASS	: 0-2
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate to slow
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	SP, SM	SM, GM	ML-CL
AASHO TEXTURE SYMBOL	A-1	A-1; A-2	A-4
LIQUID LIMIT	15-25	15-25	25-35
PLASTICITY INDEX	1-6 or NP	1-6	1-10
SHEAR STRENGTH	medium	high to medium	medium to low
SOIL TEXTURE	gravelly sandy loam	gravelly sandy loam, gravelly loam	silt loam or silty clay loam
PERMEABILITY	moderate	moderate	moderate to slow
AWSC	moderate	moderate	high
COARSE >7.5 cm (%)	0-5	0-5	0
FRAGMENTS <7.5 cm (%)	15-25	15-30	0
PASSING # 4	85-95	85-100	100
SIEVES (%) # 40	50-85	65-85	100
#200	40-60	20-40	98-100

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	6.7-7.2	6.8- 7.3	8.0-8.5
1:2 0.01M $CaCl_2$	6.1-6.5	6.3-6.8	7.6-8.1
SALINITY CLASS	non-saline	non-saline	non to very weakly saline
ORGANIC CARBON	moderate	moderate to low	very low
NITROGEN	moderate	low to medium	very low
EXCHANGE CAPACITY	high	medium	low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	medium	medium to high	medium
- Na	low	low to very low	low
- K	medium	high	high
BASE SATURATION (%)	75-85	95-100	100
PHOSPHOROUS	medium	medium	low
SULFUR	medium	low	low

GUISACHAN SOILS (GN)

GENERAL COMMENTS

Guisachan soils occupy substantial areas near Kelowna in the vicinity of Scotty and Mission creeks, and in the Similkameen Valley near Keremeos. They occur on the upper parts of the gentle undulations in the nearly level to gently sloping landscapes, while Tanaka and Rumohr soils occupy the lower lying, intervening depressions.

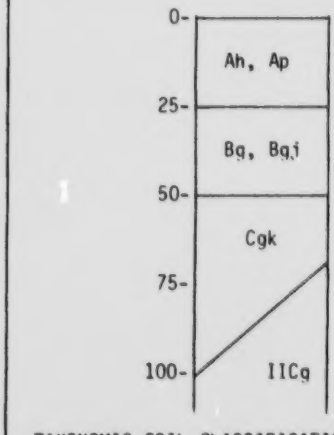
Guisachan soils have developed in a medium to moderately coarse-textured, stone free veneer, usually between 30 and 100 cm thick, which overlies gravelly, coarse-textured fluvial fan and deltaic deposits. Surface and subsurface soil textures are either loam, silt loam or sandy loam. Subsoil textures are very gravelly sand or very gravelly loamy sand. These Orthic Humic Gleysol soils are poorly drained, moderately pervious, and have high water storage capacities. Surface runoff is slow. The groundwater table is near the surface during winter and spring and gradually recedes by autumn.

Guisachan soils occupy the upper parts of the very gentle undulations.

Guisachan soils, with artificial drainage, are suited to most crops not usually sensitive to occasional high water tables. Almost all areas are cleared and cultivated and uses currently range from vegetable production to hay and pasture. Uncleared areas support willows, black cottonwood, sedges and reeds.

Guisachan soils are constrained for urban and related uses by high water tables and excavations will probably contain water during parts of the year. Septic field effluent disposal is likely to be severely impeded by the high water table as well.

GENERALIZED GUISACHAN SOIL PROFILE



Grayish-brown (10YR 5/2.5), sandy loam, silt loam or loam; weak, medium, subangular blocky structure; very friable consistence; non or very weakly saline.

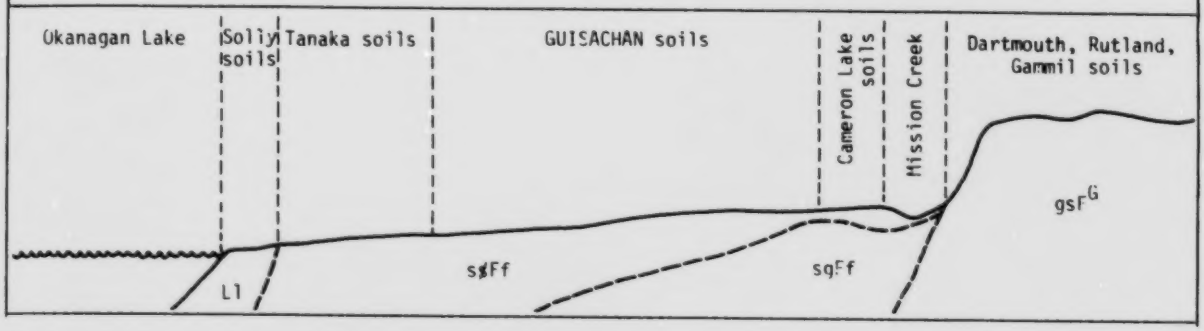
Brown (10YR 4.5/3), sandy loam, silt loam or loam; weak, medium, pseudo-platy breaking to weak, coarse, subangular blocky structure; friable consistence; many, coarse, prominent mottles.

Dark gray (5Y 4/1) or dark grayish brown (2.5Y 4.5/2), silt loam or loam; massive breaking to very weak, coarse, subangular blocky structure; friable consistence; moderately to strongly calcareous.

Very dark grayish brown (2.5Y 3/2), very gravelly loamy sand or gravelly loamy sand; single-grain; very friable consistence.

TAXONOMIC SOIL CLASSIFICATION: Orthic Humic Gleysol

GUISACHAN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	fluvial fan deposits
DEPTH TO FREE LIME (cm)	:	approximately 50
SURFACE STONINESS CLASS	:	0
DEPTH TO WATERTABLE (m)	:	varies from about 50 cm to 1.5 m
PERVIOUSNESS CLASS	:	moderate
SOIL DRAINAGE CLASS	:	poor
DEPTH TO ROOT RESTRICTION (cm)	:	70; water table
TOPOGRAPHY	:	nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM, ML	ML	GW, GM
AASHO TEXTURE SYMBOL	A-4; A-2-4	A-4	A-1; A-3; A-2-4
LIQUID LIMIT	15-25 or NP	15-25 or NP	NP
PLASTICITY INDEX	1-8 or NP	1-8 or NP	NP
SHEAR STRENGTH	medium to low	medium to low	high
SOIL TEXTURE	sandy loam, loam, silt loam	loam, silt loam	very gravelly loamy sand, very gravelly sand
PERMEABILITY	moderate	moderate	rapid
AWSC	moderate to high	moderate	low to very low
COARSE >7.5 cm (%)	0	0	0-2
FRAGMENTS <7.5 cm (%)	0	0-5	40-80
PASSING # 4	100	100	40-60
SIEVES (%) # 40	60-100	60-100	20-50
#200	30-80	30-80	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.3-7.6	6.6-8.2	7.2-8.6
1:2 0.01M $CaCl_2$	5.8-7.1	6.1-7.6	6.7-8.2
SALINITY CLASS	non-saline or very weakly saline	non-saline	non-saline
ORGANIC CARBON	low to moderate	low	very low
NITROGEN	very low	very low	very low
EXCHANGE CAPACITY	medium	medium	low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	very low	very low	very low
- K	high	high	high
BASE SATURATION (%)	75-100	95-100	100
PHOSPHOROUS	very low	very low	very low
SULFUR	medium	low	low

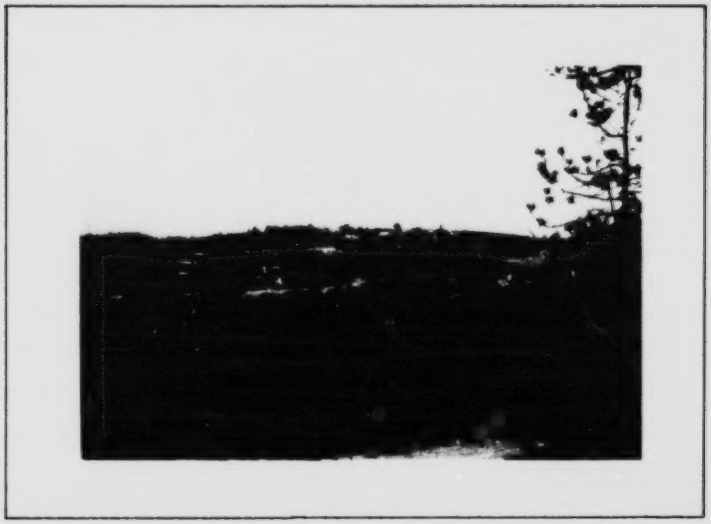
HARRLAND SOILS (HD)

GENERAL COMMENTS

Harrland soils occupy scattered, gently to very strongly sloping locations at the higher elevations of the map area, mainly near Okanagan Falls, West Summerland, Lakeview Heights, Rutland and north of Kelowna. Postill, Gammil and Kelowna soils are often closely associated with the Harrland soils.

Harrland soils have developed in moderately coarse textured glacial till, usually capped by 10 to 30 cm of sandy eolian material. Surface soil textures are sandy loam or loamy sand while subsurface and subsoil textures are gravelly sandy loam or gravelly loamy sand. These Eluviated Eutric Brunisol soils are well drained, moderately pervious and have a moderate to low water holding capacity.

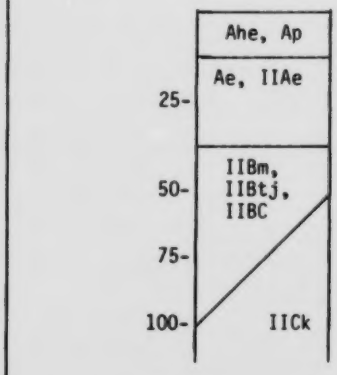
Harrland soils are generally moderately well suited for agricultural crops although in some areas adverse topography and moderate stoniness may be limiting. The usual uses are forages and tree fruits. Natural vegetation consists of Ponderosa pine and Douglas-fir with grasses and scattered sagebrush in the understory.



Harrland soils occupy the upland area in the center of the photo.

The soils are also moderately suited for urban uses. Bearing strengths are high, but stones and boulders may interfere with basement excavation in some areas. Slow subsoil percolation in some areas may also impede efficient septic tank effluent disposal.

GENERALIZED HARRLAND SOIL PROFILE



Grayish-brown (10YR 5.5/2), sandy loam or loamy sand; weak, very fine, subangular blocky structure; soft consistence.

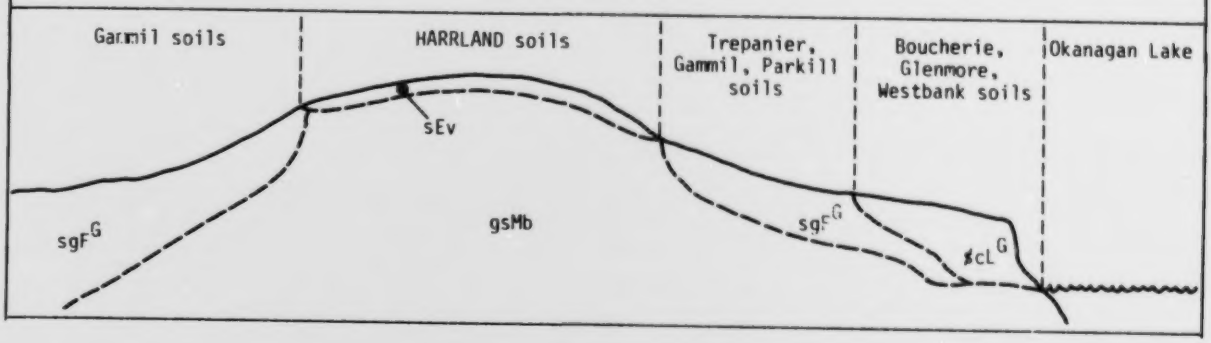
Light brownish gray (2.5Y 6/3), sandy loam; weak, fine, platy structure; slightly hard consistence.

Light yellowish brown (2.5Y 6/4), gravelly sandy loam; moderate to fine subangular blocky structure; slightly hard to hard consistence.

Light gray (2.5Y 7/2), gravelly sandy loam or gravelly loamy sand; moderate to strong, medium, angular blocky structure; slightly hard consistence; moderately to strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

HARRLAND SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: eolian veneer over glacial till
DEPTH TO FREE LIME (cm)	: 90
SURFACE STONINESS CLASS	: 0-2
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: 90; compact subsoil
TOPOGRAPHY	: gentle to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
UNIFIED TEXTURE SYMBOL	SM	SM, SC, GC
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-4
LIQUID LIMIT	10-25	15-28
PLASTICITY INDEX	1-5	1-6
SHEAR STRENGTH	medium	high to medium
SOIL TEXTURE	sandy loam, loamy sand	gravelly sandy loam, gravelly loamy sand
PERMEABILITY	moderate to rapid	moderate to slow
AWSC	low to moderate	low
COARSE >7.5 cm (%)	0-2	5-15
FRAGMENTS <7.5 cm (%)	0-10	10-40
PASSING # 4	80-95	70-90
SIEVES (%) # 40	40-60	20-60
#200	5-15	<20

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
SOIL REACTION (pH) 1:1 H_2O	7.1-8.0	7.8-8.5
1:2 0.01M $CaCl_2$	6.6-7.6	7.4-8.1
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to moderate	low to very low
NITROGEN	low	very low
EXCHANGE CAPACITY	low	low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low
- K	low	low
BASE SATURATION (%)	95-100	98-100
PHOSPHOROUS	high	high
SULFUR	medium	moderately high

HAYMAN SOILS (HN)

GENERAL COMMENTS

Hayman soils occur in association with Harrland and Peachland soils near Okanagan Falls, Westbank, Lakeview Heights and north of Ellison and Kelowna on gentle to very strong slopes.

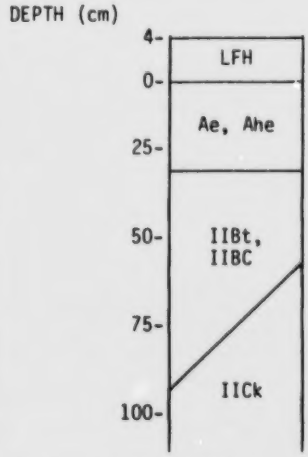
The soils have developed in moderately coarse to medium textured glacial till usually capped by 10 to 30 cm of sandy eolian materials. Surface textures are usually sandy loam or loamy sand while subsurface or subsoil textures are either gravelly sandy loam or gravelly loam. These Orthic Gray Luvisol soils are well drained, moderately pervious and have moderate water holding capacity.

The more gently sloping areas of Hayman soils are well suited for agricultural uses. Some are cleared and used mainly for pasture and forage production; a few areas are planted to tree fruits. Natural vegetation consists of Ponderosa pine, Douglas-fir with saqebrush, rabbitbrush and grasses in the understory.

Hayman soils occupy the central portion of the photo.

Hayman soils are moderately suited for urban development. Soil bearing capacities are good although adverse topography may be limiting in some areas.

GENERALIZED HAYMAN SOIL PROFILE



LFH — Loose; needles, leaves and other forest litter.

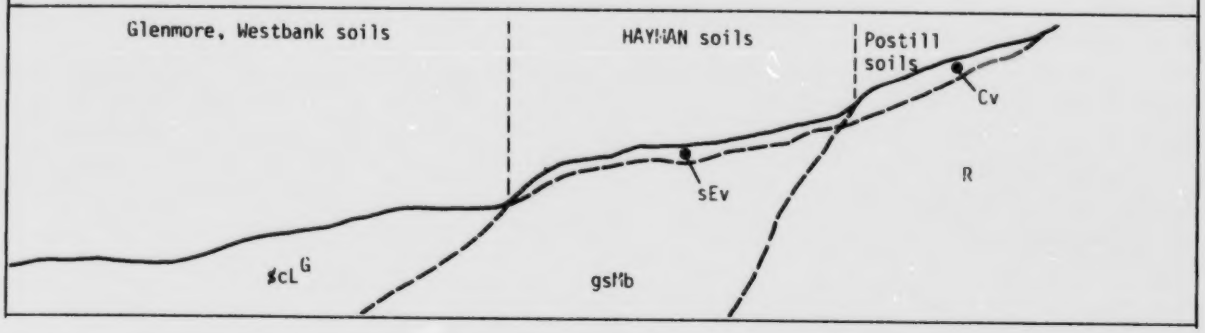
Ae, Ahe — Light brownish gray to grayish-brown (10YR 5.5/2), sandy loam or loamy sand; weak to moderate, coarse platy structure; slightly hard or friable consistence.

IIBt, IIBC — Pale brown (10YR 6/3), gravelly sandy loam or gravelly loam; moderate to strong, fine to medium subangular blocky structure; friable or firm consistence; non to weakly calcareous.

IICk — Light brownish gray (10YR 6/2.5), gravelly sandy loam or gravelly loam; moderate, medium, pseudo-platy breaking to moderate to strong, very fine angular blocky structure; hard consistence; moderately to strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Gray Luvisol

HAYMAN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	eolian veneer over glacial till
DEPTH TO FREE LIME (cm)	:	90
SURFACE STONINESS CLASS	:	0-2
DEPTH TO WATERTABLE (m)	:	>2
PERVIOUSNESS CLASS	:	moderate
SOIL DRAINAGE CLASS	:	well
DEPTH TO ROOT RESTRICTION (cm)	:	60; clay accumulation layer
TOPOGRAPHY	:	gentle to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-90 cm	>90 cm
UNIFIED TEXTURE SYMBOL	SM, SC	SC, SM	GC, GM
AASHO TEXTURE SYMBOL	A-2-4 (A-4)	A-2-4; A-1	A-2-4; A-1
LIQUID LIMIT	10-15 or NP	15-28	15-28
PLASTICITY INDEX	0.1-5 or NP	1-6	1-6
SHEAR STRENGTH	medium	medium	high to medium
SOIL TEXTURE	sandy loam, loamy sand	gravelly sandy loam, gravelly loam	gravelly sandy loam, gravelly loam
PERMEABILITY	moderate to rapid	moderate	moderate to low
AWSC	moderate	moderate	moderate to low
COARSE >7.5 cm (%)	0-5	5-15	5-20
FRAGMENTS <7.5 cm (%)	5-15	15-35	15-35
PASSING # 4	80-100	60-90	40-50
SIEVES (%) # 40	20-40	20-50	35-45
#200	5-10	10-25	10-25

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-90 cm	>90 cm
SOIL REACTION (pH) 1:1 H_2O	6.9-7.4	7.0-7.6	8.6-9.3
1:2 0.01M $CaCl_2$	6.6-6.9	6.5-7.1	8.2-8.9
SALINITY CLASS	non-saline	non-saline	non to very weakly saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	very low	very low	very low
EXCHANGE CAPACITY	low to medium	low	low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	low	low	low to medium
- K	high	low	low
BASE SATURATION (%)	60-95	85-100	100
PHOSPHOROUS	low	low	low
SULFUR	medium	medium	medium

HAYNES SOILS (HA)

GENERAL COMMENTS

Haynes soils occupy gentle to strongly sloping areas near Oliver and Osoyoos, usually in association with Osoyoos soils.

These Orthic Brown soils have developed in deep, sandy eolian deposits about 30 to 100 cm thick which overlie coarse sandy fluvioglacial deposits. Surface and subsurface textures are usually loamy sand or sand while subsoil textures consist of coarse sand or loamy sand. The soils are rapidly drained, rapidly pervious and have very low water holding capacity.

Haynes soils are poorly suited for agricultural uses, unless irrigated. Low water holding capacity, rapid permeability, low fertility and, in some locations, adverse topography and instability are all limiting. Cleared and cultivated areas usually support tree fruits and vineyards. Natural vegetation consists of rabbitbrush, sagebrush, scattered Ponderosa pine and few grasses in the understory.

The foreground is typical of Haynes soils.

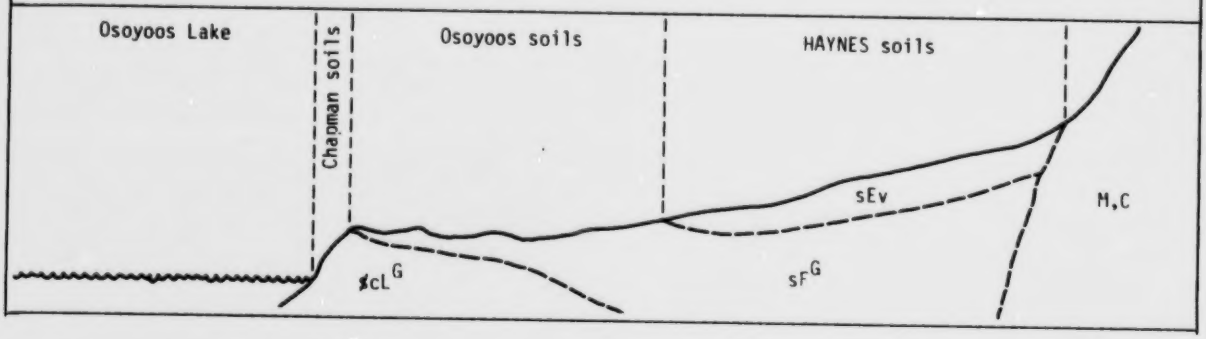
Most gentle and moderately sloping areas of Haynes soils are suitable for urban uses. The soils are well drained, easy to excavate and have good bearing strengths. Incomplete septic tank effluent filtration, due to coarse subsoil textures may be a constraint.

GENERALIZED HAYNES SOIL PROFILE

DEPTH (cm)		
0-	Ah, Ahe	Grayish-brown (10YR 5.5/2.5), loamy sand or sand; very weak, medium, subangular blocky structure grading to single-grain; soft consistence.
25-	Bm, BC	Pale brown (10YR 6/3), loamy sand or sand; single-grain; loose consistence.
50-		
75-	C	Very pale brown or pale brown (10YR 6.5/3), coarse sand or loamy sand; single-grain; loose consistence; non or weakly calcareous.
100-		

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

HAYNES SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: eolian veneer over fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >75
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	SP-SM	SP, SW
AASHO TEXTURE SYMBOL	A-3, A-1	A-3
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	loamy sand or sand	loamy sand, sand, coarse sand
PERMEABILITY	very rapid	very rapid
AWSC	low	low to very low
COARSE FRAGMENTS >7.5 cm (%)	0	0
<7.5 cm (%)	<2	<2
PASSING # 4	90-100	95-100
SIEVES (%) # 40	50-80	60-90
#200	5-15	5-10

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	6.8-8.0	8.0-8.5
1:2 0.01M $CaCl_2$	6.4-7.4	7.4-7.9
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low to very low	very low
EXCHANGEABLE CATIONS - Ca	low	low
- Mg	low	low
- Na	very low	very low
- K	very low	very low
BASE SATURATION (%)	100	100
PHOSPHOROUS	high	high
SULFUR	low	low

HIGGIN SOILS (HG)

GENERAL COMMENTS

Higgin soils occur in small areas near Summerland, Penticton and Westbank on very gentle to moderate slopes and are usually associated with Maynard, Munson, Tomlin and Solly soils.

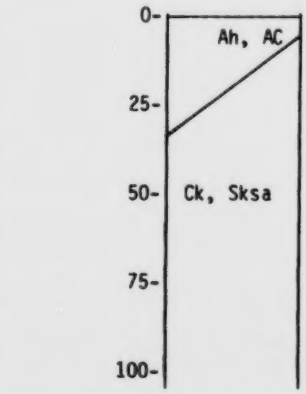
Higgin soils have developed in medium to moderately coarse textured fluvial fan deposits that had eroded from silty glaciolacustrine sediments. Surface soil textures are fine sandy loam, loam or silt loam and grade to silt loam in the subsoil. These Orthic Regosol soils are well to moderately well drained, moderately pervious and have very high water holding capacities and moderate surface runoff.

Higgin soils are generally moderately suited for agricultural uses although moderate subsoil salinity and sometimes adverse topography are sometimes limiting. Small areas are currently cleared for forage and pasture. The majority, however, is uncleared and supports sagebrush, grasses and scattered Ponderosa pine.

Generally low bearing strengths and high erodibilty are limiting for urban uses. Underground utility installations may be susceptible to corrosion if not adequately protected.

Higgin soils occupy the small fluvial fans at the base of the glaciolacustrine scarps.

GENERALIZED HIGGIN SOIL PROFILE

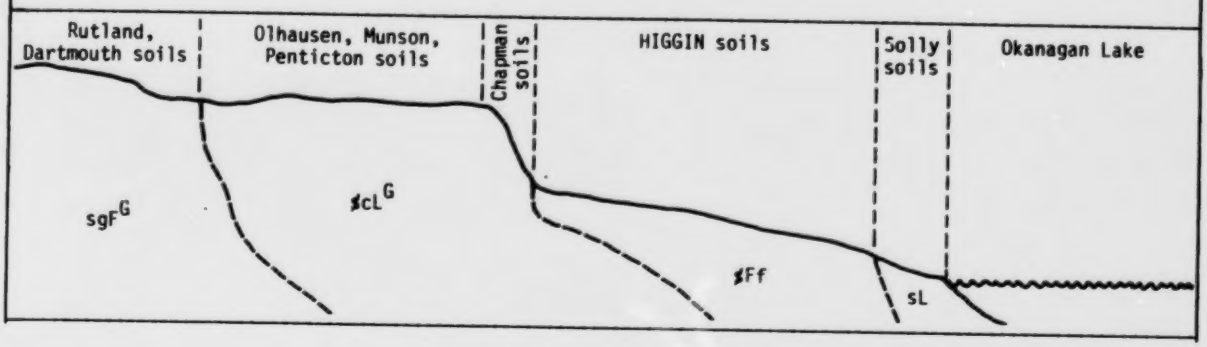


Brown (10YR 5/3), fine sandy loam, loam or silt loam; weak, fine subangular blocky structure; slightly hard consistence; moderately to strongly calcareous; horizon may be entirely absent.

Light gray (10YR 7/1.5), silt loam or fine sandy loam; massive; slightly hard consistence; strongly calcareous and weakly to moderately saline at depth.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol; calcareous phase

HIGGIN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: 0-10
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: very gentle to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH
	0-100 cm
UNIFIED TEXTURE SYMBOL	CL, ML
AASHO TEXTURE SYMBOL	A-6
LIQUID LIMIT	25-35
PLASTICITY INDEX	10-20
SHEAR STRENGTH	medium to low
SOIL TEXTURE	fine sandy loam, loam or silt loam
PERMEABILITY	moderate
AWSC	moderate to high
COARSE >7.5 cm (%)	0
FRAGMENTS <7.5 cm (%)	0-2
PASSING # 4	100
SIEVES (%) # 40	75-95
#200	25-50

CHEMICAL SOIL PROPERTIES	SOIL DEPTH
	0-100 cm
SOIL REACTION (pH) 1:1 H_2O	7.6-8.5
1:2 0.01M $CaCl_2$	7.1-8.1
SALINITY CLASS	very weakly to moderately saline
ORGANIC CARBON	very low
NITROGEN	very low
EXCHANGE CAPACITY	medium
EXCHANGEABLE CATIONS - Ca	high
- Mg	high
- Na	medium to high
- K	high
BASE SATURATION (%)	100
PHOSPHOROUS	low
SULFUR	medium to moderately high

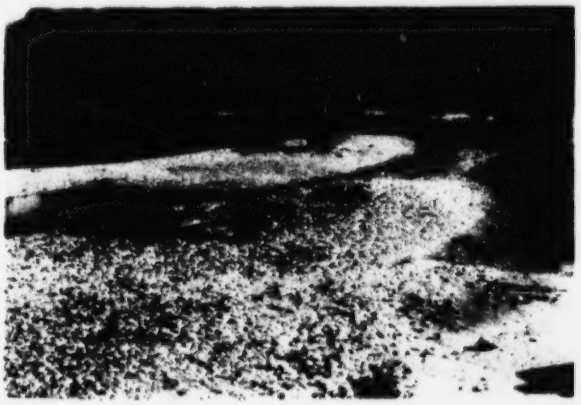
ILTCOOLA SOILS (IL)

GENERAL COMMENTS

Iltcoola soils occur on nearly level and very gently sloping islands, bars and low terraces in and adjacent to the Okanagan and Similkameen River channels. Snehumpton, Susap and Nighthawk soils usually occupy adjacent map polygons.

Iltcoola soils have developed in thin sandy to gravelly veneers up to 25 cm thick overlying very gravelly and cobbly fluvial deposits. Surface textures vary from loamy sand to gravelly sand; subsoils are very gravelly and cobbly sand or cobbly gravel. These Gleyed Regosol soils are imperfectly drained, rapidly pervious, have low water storage capacity and slow surface runoff. A fluctuating groundwater table is generally within 1.5 m of the surface.

Iltcoola soils are generally unsuited for agricultural uses due to coarse, stony textures and danger of flooding. Some higher lying areas may be developed for forage or pasture. Natural vegetation consists of willows, black cottonwood, grassy forbs and reeds.

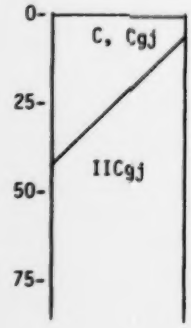


Sand and gravel bars, islands and other recently deposited materials is typical of Iltcoola soils.

The danger of flooding make Iltcoola soils unsuitable for urban uses. Abandoned older river channels located at slightly higher elevations and not limited by annual flooding are poorly suited for grazing and hay production.

GENERALIZED ILTCOOLA SOIL PROFILE

DEPTH (cm)

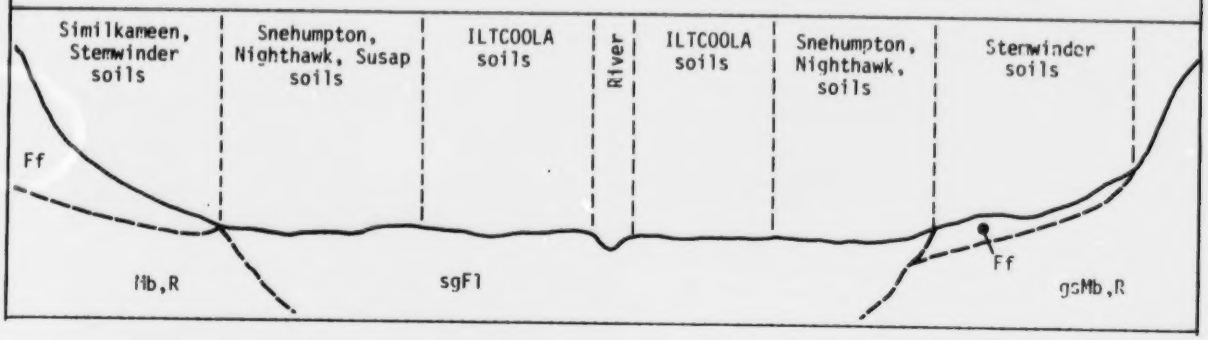


Light brownish gray or grayish-brown (2.5Y 5.5/2), loamy sand or sand; weak, fine, pseudo-platy structure grading to single-grain; soft consistence.

Pale yellow (2.5Y 6.5/4), very gravelly sand; single-grain; loose consistence.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

ILTCOOLA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0-4
DEPTH TO WATERTABLE (m)	: varies from 0 to 150 cm over the season
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: imperfect
DEPTH TO ROOT RESTRICTION (cm)	: 100; water table
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
UNIFIED TEXTURE SYMBOL	SM-SP	GP, GW
AASHO TEXTURE SYMBOL	A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	loamy sand, sand	very gravelly sand
PERMEABILITY	rapid to very rapid	very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	0-2	20-35
FRAGMENTS <7.5 cm (%)	0-5	65-95
PASSING # 4	80-100	5-10
SIEVES (%) # 40	40-60	2-8
#200	2-8	<1

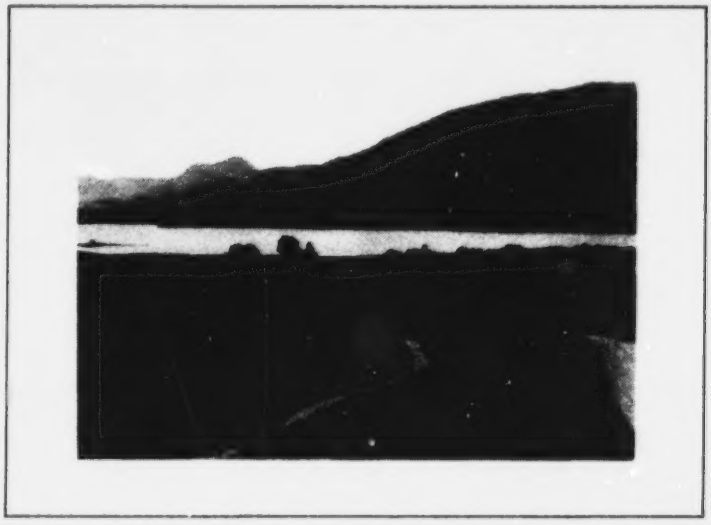
CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-25 cm	>25 cm
SOIL REACTION (pH) 1:1 H_2O	7.4-7.6	7.0-7.6
1:2 0.01M $CaCl_2$	6.8-7.2	6.6-7.1
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	very low to low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	high	low
- Mg	low	low
- Na	low	low
- K	low	low
BASE SATURATION (%)	95-100	100
PHOSPHOROUS	low to medium	very low
SULFUR	low	low

INKANEEP SOILS (IK)

GENERAL COMMENTS

Inkaneep soils occur in small scattered areas throughout the Okanagan Valley from Osoyoos Lake to Ellison Lake, usually in association with Roy Creek, Winslow, Stemwinder and Westbank soils. Slopes vary from nearly level to modertely sloping.

Inkaneep soils have developed in interbedded medium and moderately coarse textured fluvial deposits located on the lower parts of fans. Surface and subsurface textures range from sandy loam or loam to silt loam. Subsoils at depth (>100 cm) are sandy loam, loamy sand and sometimes gravelly loamy sand. Surfaces are generally non-stony. These Gleyed Humic Regosol soils are usually imperfectly drained, moderately pervious, have moderate surface runoff and medium water holding capacity. Some slightly higher-lying moderately well drained areas are included. The soils have a fluctuating groundwater table and a potential for flooding exists during annual freshets.



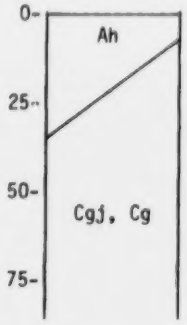
Inkaneep soils occupy the low lying area between the lake and the terrace in the foreground.

Inkaneep soils are generally well suited for agriculture if artificial drainage is installed. Most cleared and cultivated areas are used for pasture, forage or hay production although some tree fruits and grapes are also grown. Natural vegetation consists of black cottonwood, alder, willows, grasses, reeds and sedge.

Inkaneep soils are somewhat restricting for urban and related uses by fluctuating water tables and danger of flooding.

GENERALIZED INKANEEP SOIL PROFILE

DEPTH (cm)

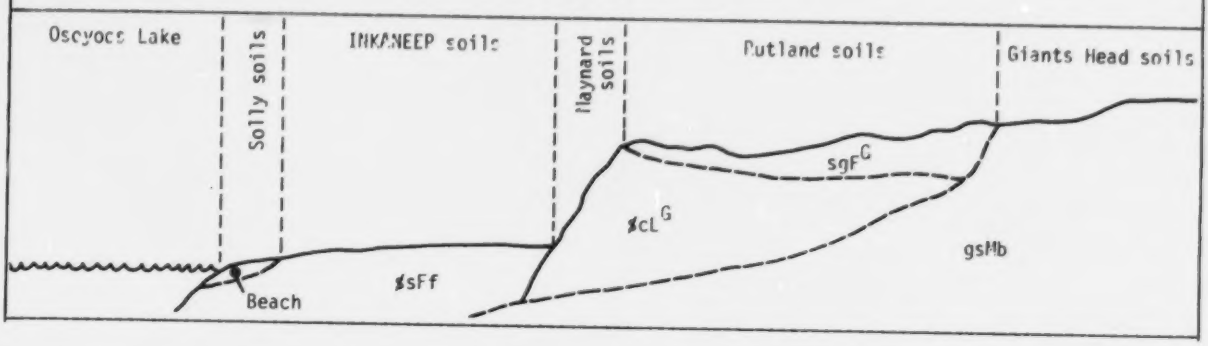


Dark grayish brown (10YR 4/2), sandy loam; moderate, fine, granular structure; very friable consistence.

Gray or grayish-brown (10YR 5/1.5), sandy loam, loam or silt loam; massive, breaking to moderate to strong, fine or medium angular blocky structure; slightly hard to hard consistence; non to weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Humic Regosol

INKANEEP SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: 80
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: varies from 50 cm to in excess of 1.5 cm over the season
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: imperfect to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 120; water table
TOPOGRAPHY	: nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
UNIFIED TEXTURE SYMBOL	SM-SW	ML
AASHO TEXTURE SYMBOL	A-4	A-4
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	low to medium	medium
SOIL TEXTURE	sandy loam, loam	interbedded sandy loam, loam and silt loam
PERMEABILITY	moderate	moderate
AWSC	moderate	moderate
COARSE FRAGMENTS >7.5 cm (%)	0	0
<7.5 cm (%)	0	0-20
PASSING # 4	100	95-100
SIEVES (%) # 40	60-70	60-90
#200	15-40	40-80

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
SOIL REACTION (pH) 1:1 H_2O	6.0-6.6	6.2-8.0
1:2 0.01M $CaCl_2$	5.5-6.1	6.5-7.5
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate to low	low to very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium	low to medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	medium
- Na	low to very low	low to very low
- K	high	medium
BASE SATURATION (%)	60-95	90-100
PHOSPHOROUS	low to medium	low
SULFUR	moderately high	low to medium

KALAMOIR SOILS (KR)

GENERAL COMMENTS

Kalamoir soils are common in the Westbank, Lakeview Heights and East Kelowna areas where they occur on nearly level to strong slopes, usually in association with Parkill, Gellatly and Knox Mountain soils.

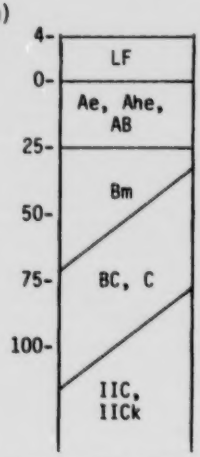
Kalamoir soils have developed in a sandy to loamy eolian veneer, usually between 20 and 80 cm thick, overlying stratified silty and sandy glaciolacustrine sediments. Surface and subsurface textures vary from fine loamy sand to sandy loam while subsoils are interbedded lenses of sandy loam, loam and silt loam. These Eluviated Eutric Brunisol soils are well drained, moderately pervious and have moderate to low water holding capacity.

Kalamoir soils with slopes less than 20% are well suited for agricultural uses although only a small portion of the total area is cleared and cultivated to forage crops and hay production. The natural vegetation consists mostly of open stands of Ponderosa pine with various grasses in the understory.

The foreground is typical of uncleared areas of Kalamoir soils.

Urban or related uses are moderately suited for Kalamoir soils. Variable soil bearing strengths in the subsoil may require special foundations and septic tank disposal fields may be limiting by restricted subsoil drainage. Steeply sloping, non-vegetated areas are prone to surface erosion.

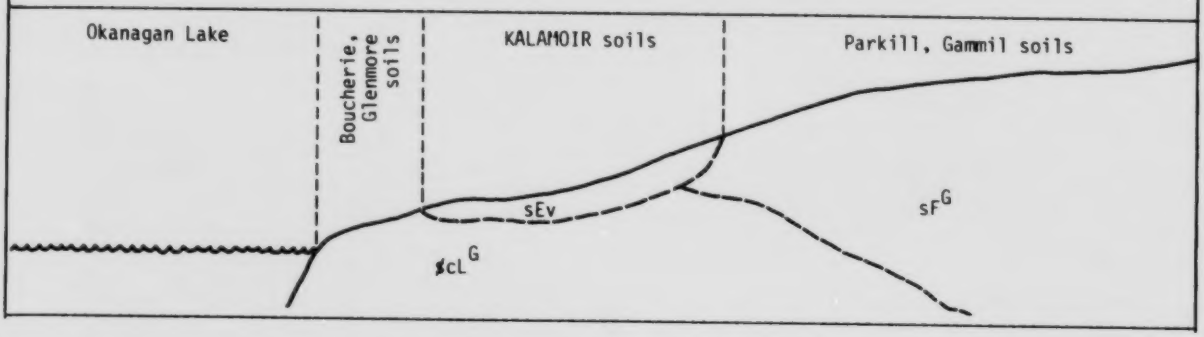
GENERALIZED KALAMOIR SOIL PROFILE



LF	Partially to undecomposed needles, leaves and other forest floor litter.
Ae, Ahe, AB	Grayish-brown (2.5Y 5/2), fine loamy sand or sandy loam; weak, fine to medium subangular blocky structure; very friable consistence.
Bm	Olive brown or light olive brown (2.5Y 4.5/2), sandy loam or fine loamy sand; weak, fine to medium, subangular blocky structure; very friable consistence.
BC, C	Light brownish gray (2.5Y 5.5/3), loamy sand; single-grain; soft consistence; non or weakly calcareous.
IIC, IICk	Light brownish gray (2.5Y 5.5/3), interbedded sandy loam, loam and silt loam; massive to weakly psudo-platy; soft consistence; weakly or moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

KALAMOIR SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: eolian veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 85
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-60 cm	>60 cm
UNIFIED TEXTURE SYMBOL	SM	SC, MC, ML
AASHO TEXTURE SYMBOL	A-2-4 (A-4)	A-4
LIQUID LIMIT	NP	15-25 or NP
PLASTICITY INDEX	NP	1-5 or NP
SHEAR STRENGTH	medium	medium to low
SOIL TEXTURE	fine loamy sand to sandy loam	interbedded silt loam, sandy loam and loam
PERMEABILITY	rapid to moderate	moderate
AWSC	low to moderate	moderate
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0-5
PASSING # 4	100	100
SIEVES (%) # 40	40-70	90-100
#200	5-15	70-90

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-60 cm	>60 cm
SOIL REACTION (pH) 1:1 H_2O	6.8-7.4	7.2-8.4
1:2 0.01M $CaCl_2$	6.3-6.9	6.8-8.0
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low to medium	medium to low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low
- K	medium	low
BASE SATURATION (%)	95-100	100
PHOSPHOROUS	high	high
SULFUR	low	low

KALEDEN SOILS (KA)

GENERAL COMMENTS

Kaleden soils occur mainly near Oliver, Okanagan Falls, Kaleden and Summerland on moderate to extreme slopes.

Kaleden soils have developed in deep, stone-free, sandy, fluvioglacial deposits. Surface and subsurface textures are typically fine sandy loam or fine loamy sand; these grade to sand in the subsoil. These Rego Brown soils are well to rapidly drained, rapidly to moderately pervious, have slow surface runoff and low water holding capacity.

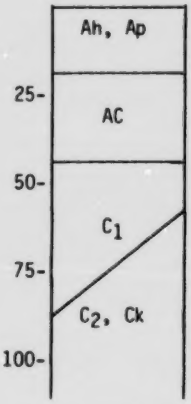
Most areas of Kaleden soils are limited for agricultural use by adverse topography and low water holding capacity. Developed areas are mainly used for grazing and hay production and a small portion is planted to tree fruits. Uncleared areas support Ponderosa pine and scattered Douglas-fir with various grasses dominant in the understory.

The sloping terrain in the foreground is typical of Kaleden soils.

Less steeply sloping areas of Kaleden soils are moderately suited for urban development because of good drainage and moderately high bearing strength. Adverse topography and potentially incomplete filtration of septic tank effluent by the coarse textured subsoil are the main restrictions.

GENERALIZED KALEDEN SOIL PROFILE

DEPTH (cm)



Grayish-brown to brown (10YR 5/2.5), fine sandy loam or loamy fine sand; weak, very fine, subangular blocky structure; very friable consistence.

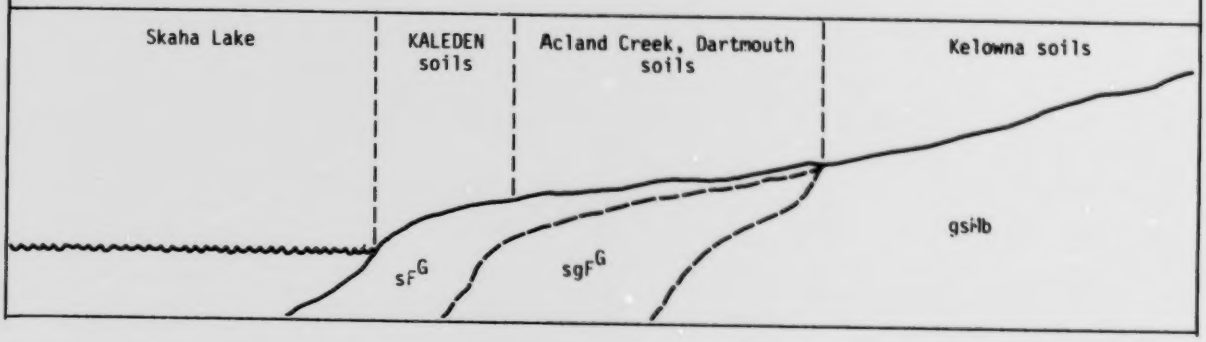
Brown (10YR 5/3), fine sandy loam or loamy fine sand; very weak, fine, subangular blocky structure grading single-grain; very friable consistence.

Brown (10YR 5/3), loamy fine sand; very weak, fine subangular blocky structure grading to single-grain; very friable consistence; non or weakly calcareous.

Brown to yellowish-brown (10YR 5/3.5), loamy sand or sand; single-grain; very friable to loose consistence; weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Rego Brown

KALEDEN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 75
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate to rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: moderate to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
UNIFIED TEXTURE SYMBOL	SM	SM
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-4
LIQUID LIMIT	5-15 or NP	NP
PLASTICITY INDEX	1-5 or NP	NP
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	fine sandy loam, loamy fine sand	fine sandy loam, loamy fine sand, sand
PERMEABILITY	moderate to rapid	rapid
AWSC	low	low
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0
PASSING # 4	100	100
SIEVES (%) # 40	45-75	20-50
#200	5-12	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
SOIL REACTION (pH) 1:1 H_2O	7.7-7.9	7.8-8.4
1:2 0.01M $CaCl_2$	7.0-7.4	7.3-8.1
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	medium	medium
- Na	low	low
- K	high	medium
BASE SATURATION (%)	100	100
PHOSPHOROUS	high	very low to low
SULFUR	moderately high	low

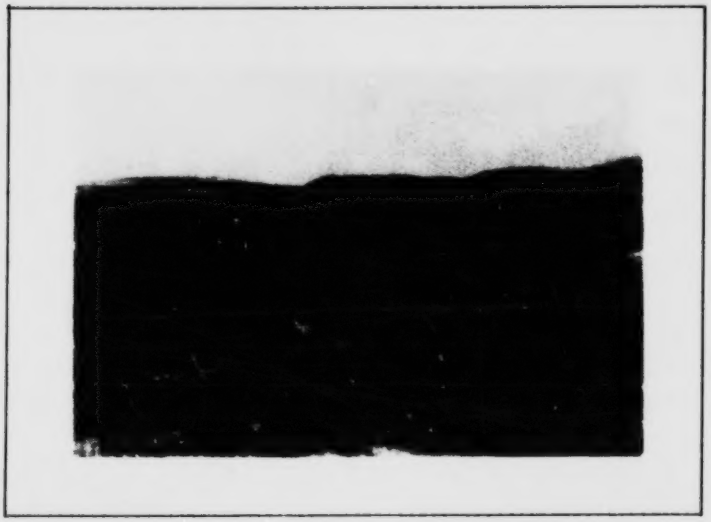
KELOWNA SOILS (KE)

GENERAL COMMENTS

Kelowna soils occur in small areas near Okanagan Falls, Summerland and Westbank. They are also relatively common at the higher elevations on west-facing, moderate to strong slopes near Rutland. Harrland, Faulder, Oyama and Rutland soils are often closely associated with Kelowna soils either in complexes or in adjacent map polygons.

The soils have developed in a sandy to loamy eolian veneer, between 10 and 30 cm thick, overlying glacial till. Surface textures are loam or sandy loam while subsurface and subsoil textures range from gravelly sandy loam to gravelly loam. These Orthic Dark Brown soils are well drained, moderately pervious and have a moderate water holding capacity.

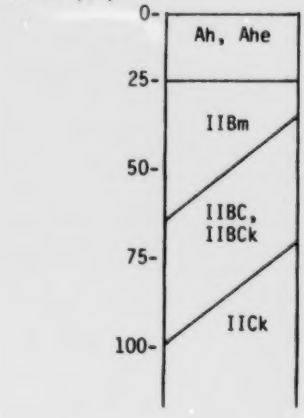
Kelowna soils are well suited for most agricultural crops although adverse topography and stoniness may be limiting in some areas. Cultivated and irrigated areas with moderately sloping topography are planted to tree fruits and vineyards. Natural vegetation consists mostly of various grasses, sagebrush and scattered Ponderosa pine.



Shows the hummocky topography (right foreground) of glacial till.

Kelowna soils are moderately well suited for urban development. Soil bearing strengths are high but septic tank effluent disposal may be impeded in some areas by the moderately slowly permeable subsoil. Adverse slopes may be limiting in some areas as well.

GENERALIZED KELOWNA SOIL PROFILE



Dark grayish brown (10YR 4/2), sandy loam or loam; moderate, fine to medium, granular structure; soft or slightly hard consistence.

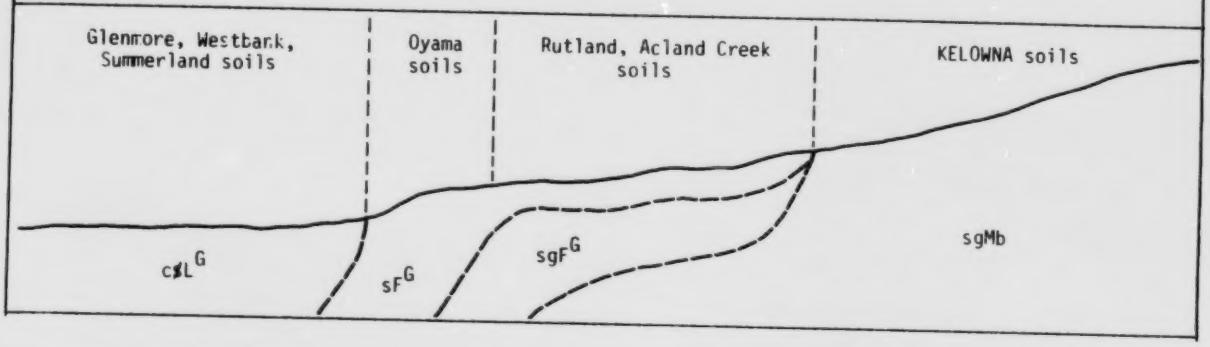
Brown or yellowish-brown (10YR 5.5/3.5), gravelly loam or gravelly sandy loam; weak to moderate, fine, subangular blocky structure; slightly hard consistence.

Light gray or light brownish gray (2.5Y 6.5/2), gravelly sandy loam; weak to moderate, medium angular blocky structure; soft to slightly hard consistence; weakly to moderately calcareous.

Light gray (10YR 7/1.5), gravelly sandy loam; moderate to strong, medium or coarse, pseudo-platy breaking to moderate, fine, angular blocky structure; hard or very hard consistence; moderately to strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

KELOWNA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: eolian veneer over glacial till
DEPTH TO FREE LIME (cm)	: 50
SURFACE STONINESS CLASS	: 1-3
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: 80; compact subsoil
TOPOGRAPHY	: moderate and strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
UNIFIED TEXTURE SYMBOL	SM, SC	SC, GC
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-2-6; A-1
LIQUID LIMIT	NP	10-20
PLASTICITY INDEX	NP	1-6
SHEAR STRENGTH	medium	medium to high
SOIL TEXTURE	sandy loam, loam	gravelly sandy loam, gravelly loam
PERMEABILITY	moderate	moderate
AWSC	moderate	moderate
COARSE >7.5 cm (%)	0-5	0-15
FRAGMENTS <7.5 cm (%)	10-25	20-50
PASSING # 4	-	30-60
SIEVES (%) # 40	-	20-50
#200	-	5-30

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
SOIL REACTION (pH) 1:1 H_2O	7.0-7.7	8.0-8.4
1:2 0.01M $CaCl_2$	6.5-7.2	7.5-7.9
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate to low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium	low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	low to medium
- Na	low	low
- K	high	low
BASE SATURATION (%)	85-100	95-100
PHOSPHOROUS	high	high
SULFUR	low	low

KENDALL SOILS (KD)

GENERAL COMMENTS

Kendall soils occur in scattered areas near Oliver, Olalla, Summerland and Kelowna where they are usually associated with Kinney, Solly and Tanaka soils. The topography is depressional to very gently sloping.

Kendall soils have developed in organic deposits between 40 and 160 cm thick, and overlie sandy fluvial deposits. The surface layer is partially decomposed and consists of sedges, reeds and shrub remains. The subsurface organic material is well decomposed. The underlying mineral subsoil is loamy sand or sand.

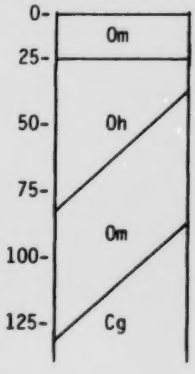
The soils are very poorly drained and have a high water holding capacity and slow surface runoff. The water table is generally near 50 cm below the surface. The soil classification is Terric Mesic Humisol.

Kendall soils are limited for agriculture by the high water table. Presently cleared areas are used for grazing and hay production. Uncleared areas support willows, alders, reeds, sedges and grasses.

Kendall soils occupy the clear portion of the photo.

Urban and related uses are poorly suited for Kendall soils. The organic material provides poor bearing strength while the high water table precludes basements or other excavations. Septic tank installations are also severely restricted by the high water tables.

GENERALIZED KENDALL SOIL PROFILE



Black (10YR 2.5/1.5 m), mesic organic material; moderate, medium, subangular blocky structure; friable consistence; non or slightly calcareous.

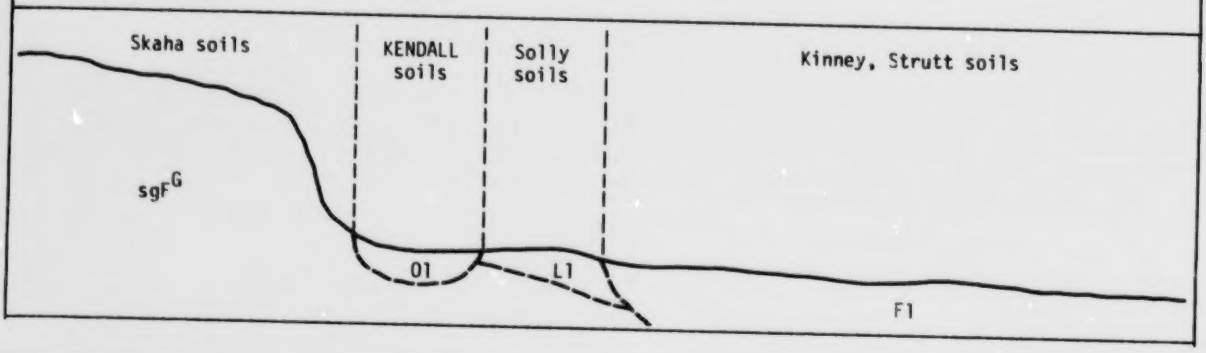
Very dark grayish brown (10YR 3/1.5 m), humic organic material; weak to moderate, medium, subangular blocky structure; friable or very friable consistence.

Very dark grayish brown (10YR 3/2), mesic organic material; massive; very friable consistence.

Dark gray to dark olive (10YR 4/1.5), loamy sand; massive; slightly sticky consistence.

TAXONOMIC SOIL CLASSIFICATION: Terric Mesic Humisol

KENDALL SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >5
PARENT MATERIAL	: organic deposits over fluvial mineral deposits
DEPTH TO FREE LIME (cm)	: >100 cm
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuating from 10 cm to 1 m
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: very poor
DEPTH TO ROOT RESTRICTION (cm)	: 50; groundwater table
TOPOGRAPHY	: nearly level to slightly depressional

PHYSICAL SOIL PROPERTIES	SOIL DEPTH			
	0-30 cm	30-65 cm	65-110 cm	>110 cm
UNIFIED TEXTURE SYMBOL	Pt	Pt	Pt	SP
AWSC	very high	very high	very high	low
TYPE OF ORGANIC MATERIAL	mesic	humic	mesic	-
RUBBED FIBRE CONTENT (%)	20	6-7	20	-
von POST SCALE	6	8	5, 6	-
PHROPHOSPHATE INDEX	5	3	4	-
SOIL TEXTURE	-	-	-	loamy sand
COARSE >7.5 cm (%)	N/A	N/A	N/A	0
FRAGMENTS <7.5 cm (%)	N/A	N/A	N/A	0
PASSING # 4	N/A	N/A	N/A	100
SIEVES (%) # 40	N/A	N/A	N/A	50-75
#200	N/A	N/A	N/A	2-6

CHEMICAL SOIL PROPERTIES	SOIL DEPTH			
	0-30 cm	30-65 cm	65-110 cm	>110 cm
SOIL REACTION (pH) 1:1 H_2O	7.0-8.0	5.8-6.2	6.0-6.2	5.2-5.4
1:2 0.01M $CaCl_2$	6.6-7.5	5.2-5.9	5.8-6.0	5.2-5.4
SALINITY CLASS	non-saline	non-saline	non-saline	non-saline
ORGANIC CARBON	very high	very high	very high	low
NITROGEN	high	high	high	very low
EXCHANGE CAPACITY	very high	very high	very high	very low
EXCHANGEABLE CATIONS - Ca	high	high	high	medium
- Mg	high	high	high	high
- Na	very high	very high	very high	very high
- K	very high	moderately high	high	low
BASE SATURATION (%)	80-100	80-85	80-85	90-100
PHOSPHOROUS	low	very low	very low	very low
SULFUR	very high	very high	very high	very high

KEREMEOS SOILS (K)

GENERAL COMMENTS

Keremeos soils occur mainly near Keremeos, Cawston and Nighthawk. They occupy nearly level and very gentle slopes on the higher terraces of the Similkameen River floodplain, usually in close association with Bullock and Suehumpton soils.

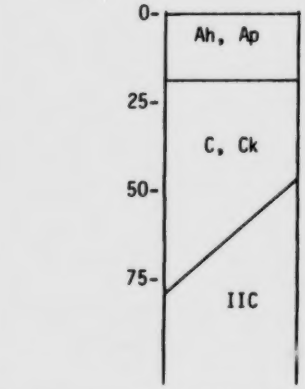
Keremeos soils have developed in medium to moderately coarse textured, gravel-free veneers, between 60 and 100 cm thick, overlying gravelly fluvial deposits. Surface and subsurface textures vary from sandy loam to silt loam while subsoils are gravelly sandy loam or gravelly loamy sand. These Orthic Humic Regosol soils are well to moderately well drained, moderately pervious and have moderate water holding capacities.

Keremeos soils are well suited for agricultural uses. Cleared and cultivated areas are used for alfalfa and hay production or are planted to tree fruits. The native vegetation consists of various shrubs and grasses, scattered Ponderosa pine and willow, poplar and black cottonwood near the river's edge.

Keremeos soils are generally well suited for urban uses although coarse subsoil textures may constrain septic tank effluent filtration.

Nearly level to gently undulating topography is typical of Keremeos soils.

GENERALIZED KEREMEOS SOIL PROFILE



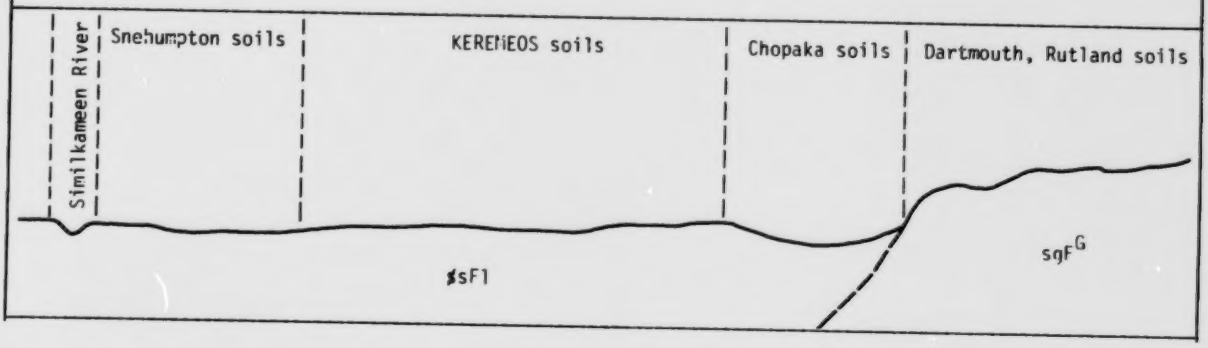
Ah, Ap: Dark brown (10YR 3/3), silt loam; weak to moderate, medium, granular structure; very friable consistence; non or weakly calcareous.

C, Ck: Brown or yellowish-brown (10YR 4.5/3.5), silt loam or loam; moderate, medium, subangular blocky structure; friable consistence; weakly to moderately calcareous.

IIC: Brown or pale brown (10YR 5.5/3), gravelly loamy sand or gravelly sandy loam with lenses of loamy sand; massive breaking to very weak, subangular blocky; friable consistence.

TAXONOMIC SOIL CLASSIFICATION: Orthic Humic Regosol

KEREMEOS SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	:	25; subsoil is lime free
SURFACE STONINESS CLASS	:	0
DEPTH TO WATERTABLE (m)	:	>1.5
PERVIOUSNESS CLASS	:	moderate
SOIL DRAINAGE CLASS	:	well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	:	none
TOPOGRAPHY	:	nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	ML-CL	SC, SM
AASHO TEXTURE SYMBOL	A-4	A-4; A-2-4
LIQUID LIMIT	15-25	22-28
PLASTICITY INDEX	1-5	1-5
SHEAR STRENGTH	medium to low	medium to low
SOIL TEXTURE	sandy loam, silt loam, loam	gravelly sandy loam, gravelly loamy sand or loamy sand
PERMEABILITY	moderate	rapid
AWSC	moderate to high	low to moderate
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0-3	10-50
PASSING # 4	100	100
SIEVES (%) # 40	65-85	20-40
#200	50-70	5-18

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.0-8.3	7.5-7.8
1:2 0.01M $CaCl_2$	6.5-7.8	7.1-7.4
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate	low to very low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium	very low to low
EXCHANGEABLE CATIONS - Ca	high	low
- Mg	high	low
- Na	low	low
- K	medium	low
BASE SATURATION (%)	98-100	100
PHOSPHOROUS	medium to high	low
SULFUR	medium to moderately high	low

KINNEY SOILS (KY)

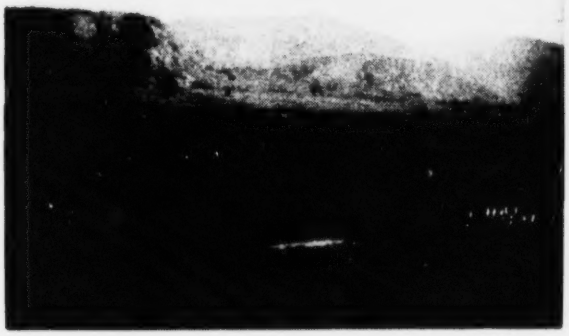
GENERAL COMMENTS

Kinney soils occur on the Okanagan River floodplain between Penticton and Osoyoos Lake. They occupy the slightly higher-lying, nearly level to very gently slopes in association with Chopaka, Cawston and Strutt soils.

Kinney soils have developed in a loamy fluvial veneer, usually between 30 and 80 cm thick, that overlies sandy floodplain deposits. Surface and subsurface textures are sandy loam or loam; the subsoil is loamy sand or sand and sometimes contains thin silty lenses. These Gleyed Regosol soils are imperfectly drained, moderately pervious and have moderate to low water holding capacity. Periodic water tables fluctuate with the level of the Okanagan River.

The main agricultural limitations of Kinney soils are moderately high water tables in late spring and in some areas, moderate salinity in the surface and potential for flooding. Cultivated areas are used for pasture and hay production. Natural vegetation occurs in a few areas and consists of black cottonwood, aspen, willow and scattered Ponderosa pine on slightly elevated dryer sites.

Urban uses of Kinney soils are restricted by periodic high water tables and potential for flooding.



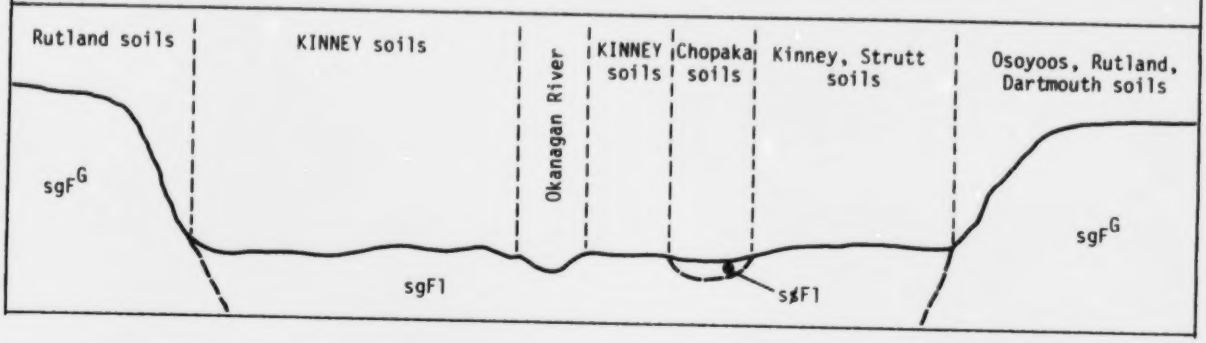
Kinney soils occupy the higher areas on the gently undulating central portion of the photo.

GENERALIZED KINNEY SOIL PROFILE

DEPTH (cm)		
0-	Ap,AC	Dark gray or gray (10YR 4.5/1.5), loam or sandy loam; moderate to strong, fine, pseudo-platy structure breaking to moderate to strong, very fine, angular blocky peds; slightly hard consistence; lower part weakly calcareous; sometimes slightly to moderately saline.
25-		
50-	Cgj	Pale brown (10YR 6/3), sandy loam; massive, breaking to moderate to strong, medium, angular blocky peds; slightly hard to hard consistence; common, fine, distinct, brownish-yellow (10YR 6/6) mottles.
75-		
100-	IICg	Light gray (10YR 6/1), loamy sand or sand; very weak, very fine, subangular blocky structure; very friable consistence; many, medium, distinct, strong brown (7.5YR 5/6) mottles.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

KINNEY SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	:	surface is sometimes weakly calcareous, subsoil is generally lime free
SURFACE STONINESS CLASS	:	0
DEPTH TO WATERTABLE (m)	:	fluctuates from about 25 cm to over 1.5 m
PERVIOUSNESS CLASS	:	moderate
SOIL DRAINAGE CLASS	:	imperfect
DEPTH TO ROOT RESTRICTION (cm)	:	100; water table
TOPOGRAPHY	:	nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-100 cm	>100 cm
UNIFIED TEXTURE SYMBOL	ML	SM-SP
AASHO TEXTURE SYMBOL	A-4	A-2-4; A-2
LIQUID LIMIT	10-25 or NP	10-25 or NP
PLASTICITY INDEX	0.1-5 or NP	0.1-5 or NP
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	sandy loam, loam	loamy sand or sand
PERMEABILITY	moderate	rapid
AWSC	moderate	low
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0-5
PASSING # 4	100	100
SIEVES (%) # 40	70-100	60-70
#200	40-70	30-40

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-100 cm	>100 cm
SOIL REACTION (pH) 1:1 H_2O	7.5-8.4	7.0-7.5
1:2 0.01M $CaCl_2$	7.1-8.0	6.6-7.0
SALINITY CLASS	non to moderately saline	non-saline
ORGANIC CARBON	moderate to low	very low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	low to medium
- Na	high	low
- K	high	low
BASE SATURATION (%)	100	100
PHOSPHOROUS	variable	very low
SULFUR	high	low to medium

KLOAG PASS SOILS (KG)

GENERAL COMMENTS

Kloag Pass soils only occur adjacent to Osoyoos Lake on gentle and moderate slopes usually in association with Solly and Kinney soils.

The well to rapidly drained Kloag Pass soils have developed in gravelly, coarse-textured lacustrine beach deposits. Surface textures vary from very gravelly sandy loam to very gravelly loamy sand; subsurface and subsoil textures are very gravelly loamy sand. These Orthic Dark Brown soils are rapidly pervious and have low water holding capacity.

Natural vegetation consists of various grassses, sagebrush, rabbitbrush, willow and scattered Ponderosa pine near the lake's edge. The soils have a very limited occurrance and are only used for recreational persuits such as campgrounds. Proper placement of outdoor sanitary facilities is important as incomplete effluent filtration due to coarse subsoil textures may contaminate groundwater.

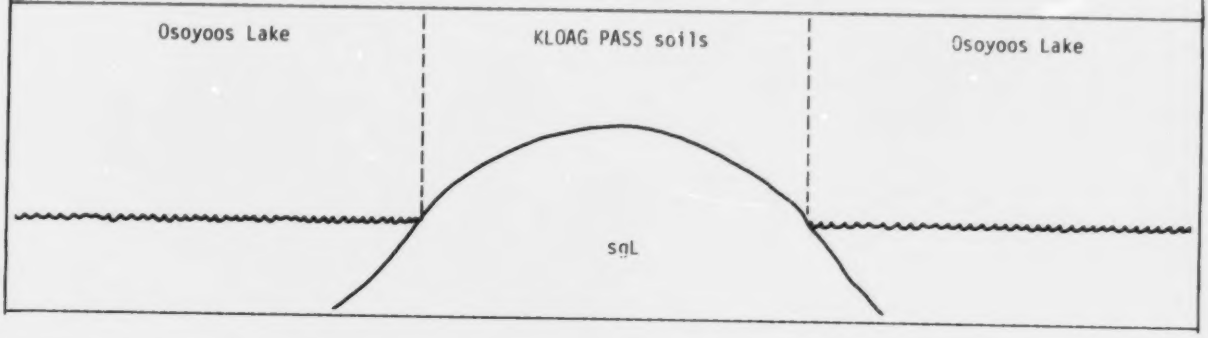
Vegetation on Kloag Pass soils near Osoyoos Lake.

GENERALIZED KLOAG PASS SOIL PROFILE

DEPTH (cm)		
0-	Ah	Dark brown (10YR 3.5/3), very gravelly sandy loam or very gravelly loamy sand; weak, medium, subangular blocky structure; soft to slightly hard consistence.
25-	Bm, BC	Pale brown (10YR 6/3), very gravelly loamy sand; single-grain; loose to soft consistence.
50-		
75-	C	Light gray (10YR 6.5/1.5), very gravelly loamy sand; single-grain; loose consistence; non to weakly calcareous.
100-		

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

KLOAG PASS SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: lacustrine beach deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 1-2
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: very gentle to gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
UNIFIED TEXTURE SYMBOL	SM, GM	GM
AASHO TEXTURE SYMBOL	A-1; A-2	A1; A2
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	high to medium	high
SOIL TEXTURE	very gravelly loamy sand	very gravelly loamy sand, very gravelly sandy loam
PERMEABILITY	rapid	rapid
AWSC	low	low
COARSE >7.5 cm (%)	0-5	0-5
FRAGMENTS <7.5 cm (%)	40-60	40-75
PASSING # 4	80-95	80-95
SIEVES (%) # 40	40-75	30-65
#200	<8	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
SOIL REACTION (pH) 1:1 H_2O	7.2-7.8	6.8-7.4
1:2 0.01M $CaCl_2$	6.8-7.4	6.5-6.9
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate	low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium to low	low
EXCHANGEABLE CATIONS - Ca	low	low
- Mg	low	low
- Na	low	low
- K	low	low
BASE SATURATION (%)	80-95	90-100
PHOSPHOROUS	low	low
SULFUR	low	low

KNOX MOUNTAIN SOILS (KN)

GENERAL COMMENTS

Knox Mountain soils are common northeast of Kelowna and near Okanagan Mission where they occur on gentle to strong slopes in association with Glenmore, Kalamoir, and Greata soils.

The well drained Knox Mountain soils have developed in loamy to sandy fluvioglacial veneers, between 10 to 50 cm thick, and overlie interstratified silty and sandy glaciolacustrine sediments. Surface and subsurface textures are sandy loam or loam, while the subsoil consists of alternating bands of silty clay loam, clay loam and loamy fine sand. These Eluviated Eutric Brunisol soils are moderately pervious and have moderate water holding capacity.

Knox Mountain soils are well suited for most agricultural crops although only a few areas are cleared and cultivated. These are used for pasture and hay production or are planted to orchards. Native vegetation consists of ponderosa pine, various grasses and shrubs, and scattered Douglas-fir.

An uncleared moderately sloping area of Knox Mountain soils.

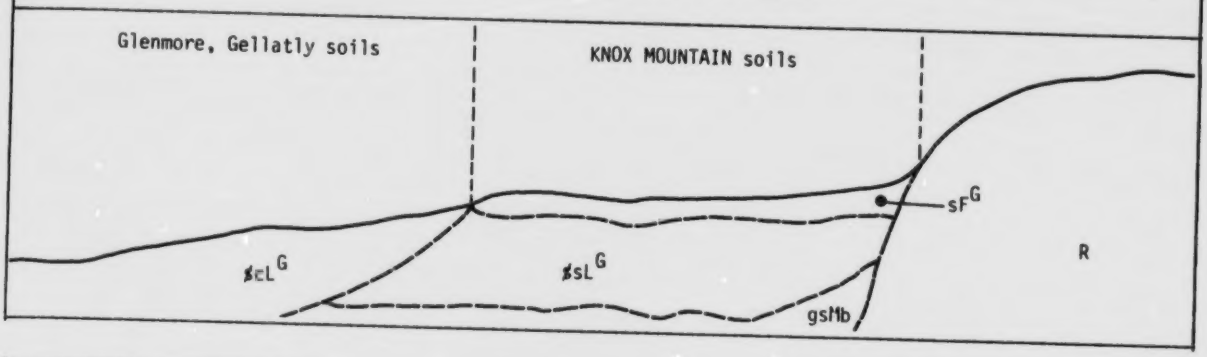
Knox Mountain soils are generally moderately suited for urban uses although adverse topography may be restricted in some areas. Seepage of incompletely filtered effluent from septic tank fields along the interbedded subsoil may occur downslope and may cause groundwater contamination.

GENERALIZED KNOX MOUNTAIN SOIL PROFILE

DEPTH (cm)		
4-0	LFH	Needles, twigs, leaves and other forest litter.
25	Ae, Ahe	Grayish-brown (10YR 5/2), loam or sandy loam; weak, medium, subangular blocky structure; very friable consistence.
50	Bm, Btj	Brown or pale brown (10YR 5.5/3), sandy loam or loam; weak, fine to medium, subangular blocky structure; friable to firm consistence.
75	IIBCk, IIBCca	Pale brown (10YR 5.5/3), banded silty clay loam, clay loam and loamy fine sand; strong, fine, pseudo-platy breaking to fine, angular blocky structure; firm consistence; moderately to strongly calcareous.
100	IICk	Pale brown (10YR 5.5/2.5), banded sandy clay, clay loam and fine loamy sand; strong, fine to medium, pseudo-platy; firm consistence; moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

KNOX MOUNTAIN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 60
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate to slow
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM-ML	CL-ML
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-4
LIQUID LIMIT	NP	15-25
PLASTICITY INDEX	NP	1-10
SHEAR STRENGTH	medium	medium to low
SOIL TEXTURE	loam, sandy loam	banded sandy clay, clay loam and loamy fine sand
PERMEABILITY	moderate	slow to moderate
AWSC	moderate	moderate to high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0-2	0
PASSING # 4	100	100
SIEVES (%) # 40	85-95	85-100
#200	50-75	70-80

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	7.0-7.5	8.0-8.6
1:2 0.01M $CaCl_2$	6.5-7.1	7.6-8.2
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium	low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low
- K	high	medium
BASE SATURATION (%)	95-100	100
PHOSPHOROUS	high	high
SULFUR	low to medium	low

LAMBLY SOILS (LY)

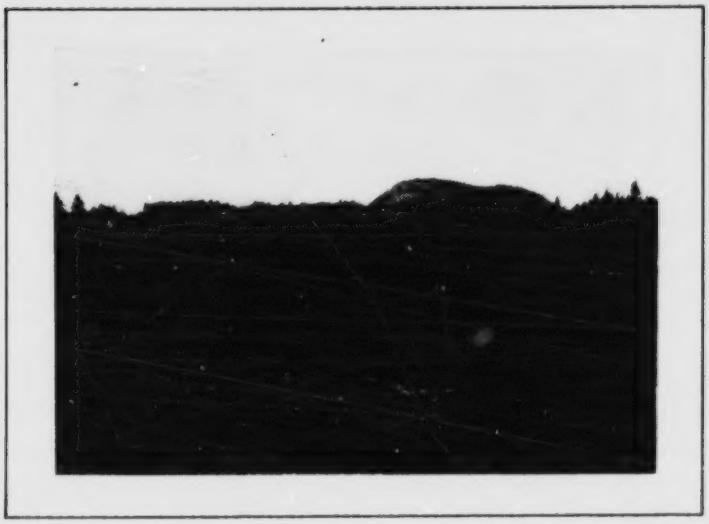
GENERAL COMMENTS

Lambly soils occur near Boucherie Mountain on very gentle to strong slopes, often in association with Gellatly, Kalamoir, Westbank and Parkill soils.

Lambly soils have developed in a loamy to silty glaciolacustrine veneer, usually between 30 and 80 cm thick and overlies sandy fluvioglacial deposits. Surface and subsurface textures range from loam to silt loam while subsoils are loamy sand or sand. The well drained, moderately pervious Orthic Gray Luvisol soils have a high to moderate water storage capacity.

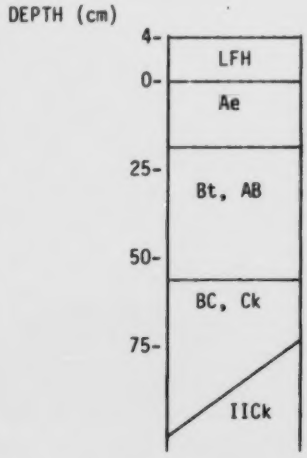
Lambly soils are generally well suited for agricultural production although strong slopes are limiting in some areas. Cleared and cultivated areas are planted to orchards, vineyards and forages. The natural vegetation consists primarily of Ponderosa pine with various grasses in the understory.

Adverse topography may restrict some urban uses in some areas.



Lambly and Westbank soils occupy the centre right of the photo and are surrounded by the higher lying Parkill and Kalamoir soils.

GENERALIZED LAMBLY SOIL PROFILE



Well to undecomposed leaves, and other forest floor material.

Grayish-brown to brown (10YR 5/2.5), loam or silt loam; moderate, very fine platy breaking to weak, medium to fine, subangular blocky structure; very friable consistence.

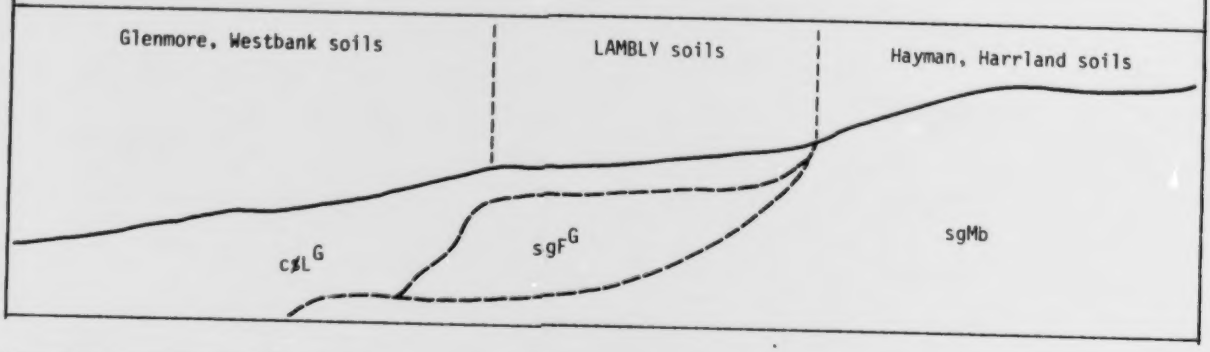
Light olive brown (2.5Y 5/4), silt loam or silty clay loam; moderate to strong, coarse, subangular blocky structure; hard to very hard consistence.

Light gray (5Y 7/1) to light olive gray (5Y 6/2.5), silt loam or laom; moderate, coarse,pseudo-platy structure breaking to moderate to strong, medium, subangular blocky peds; hard to very hard consistence, moderately to strongly calcareous.

Light brownish gray (2.5Y 6/2), interstratified loamy sand, sand and fine sandy loam; single-grain; soft consistence; weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Gray Luvisol

LAMBLY SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: (glacio) lacustrine veneer over fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 60
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: 30; clay enriched subsurface layer
TOPOGRAPHY	: very gentle to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	ML-CL	SM-SP
AASHO TEXTURE SYMBOL	A-4	A-4; (A-3)
LIQUID LIMIT	10-25	NP
PLASTICITY INDEX	1-5	NP
SHEAR STRENGTH	medium to low	medium
SOIL TEXTURE	loam, silt loam	loamy sand, sand, very fine sandy loam
PERMEABILITY	moderate	rapid
AWSC	high to moderate	low
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0
PASSING # 4	100	100
SIEVES (%) # 40	85-95	90-98
#200	60-70	15-25

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.7-8.2	8.0-8.6
1:2 0.01M $CaCl_2$	6.4-7.7	7.5-8.1
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	high
- K	medium	moderately high
BASE SATURATION (%)	85-100	100
PHOSPHOROUS	medium	low
SULFUR	low to medium	low

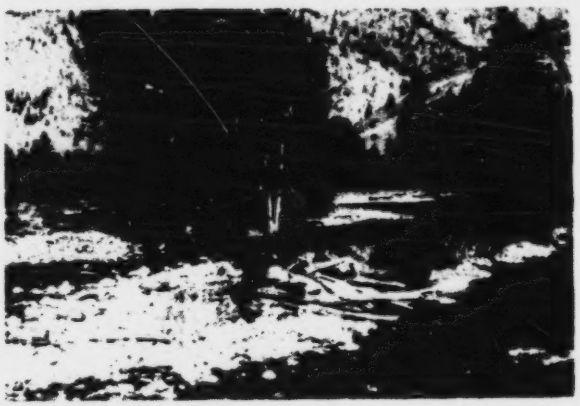
MANERY SOILS (MY)

GENERAL COMMENTS

Manery soils occur throughout the map area; usually associated with Canyonview, Roy Creek, Tomlin and Inkaneep soils.

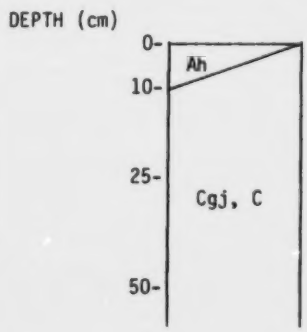
Manery soils have developed in stony and bouldery, coarse textured fluvial fan deposits that occur in and along present day stream channels. Surface, subsurface and subsoil textures vary from stony gravelly loamy sand to very gravelly sand. These Orthic Regosol soils are imperfectly to moderately well drained, rapidly pervious and have low water holding capacity. Groundwater tables generally fluctuate with water levels in adjacent streams and flooding is usual during periods of high water.

Most areas are unsuited for either agricultural or urban uses because of periodic flooding, coarse stony and gravelly textures and fluctuating groundwater tables. Natural vegetation is mainly deciduous and consists of black cottonwood, alders, willows and western red cedar.



A typical example of Manery soils along the Ashnola River.

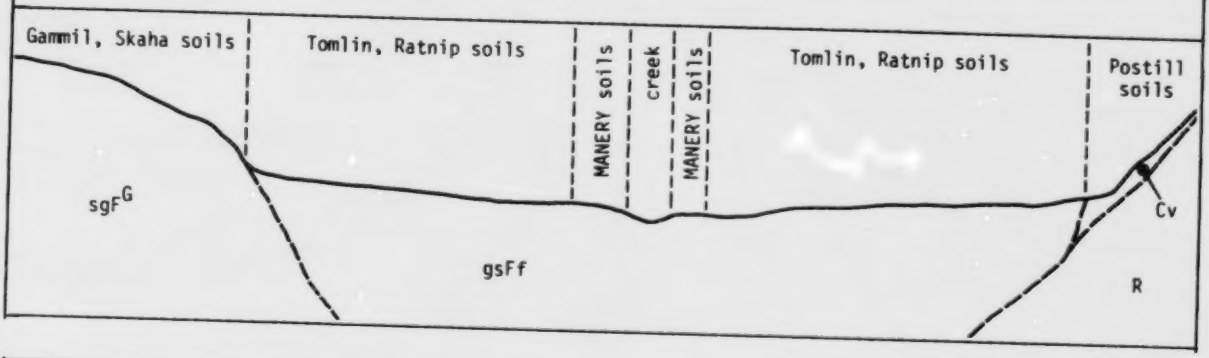
GENERALIZED MANERY SOIL PROFILE



Light brownish gray to pale brown (10YR 6/2.5), stony, gravelly loamy sand to very gravelly sand; single-grain; loose consistence.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

MANERY SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 2-5
DEPTH TO WATERTABLE (m)	: variable; fluctuates from the surface to >1 m over the year
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: imperfect to moderately well; occasionally rapid
DEPTH TO ROOT RESTRICTION (cm)	: 60; variable water table
TOPOGRAPHY	: nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH
	0-100
UNIFIED TEXTURE SYMBOL	GP-GM
AASHO TEXTURE SYMBOL	A-1; A-2
LIQUID LIMIT	NP
PLASTICITY INDEX	NP
SHEAR STRENGTH	high
SOIL TEXTURE	stony, very gravelly loamy sand; very gravelly sand
PERMEABILITY	rapid
AWSC	very low
COARSE >7.5 cm (%)	10-50
FRAGMENTS <7.5 cm (%)	15-75
PASSING # 4	20-60
SIEVES (%) # 40	5-20
#200	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH
	0-100
SOIL REACTION (pH) 1:1 H_2O	6.9-7.6
1:2 0.01M $CaCl_2$	6.4-7.1
SALINITY CLASS	non-saline
ORGANIC CARBON	very low
NITROGEN	very low
EXCHANGE CAPACITY	very low
EXCHANGEABLE CATIONS - Ca	medium
- Mg	low
- Na	low
- K	low
BASE SATURATION (%)	90-100
PHOSPHOROUS	very low
SULFUR	low

MAYNARD SOILS (MD)

GENERAL COMMENTS

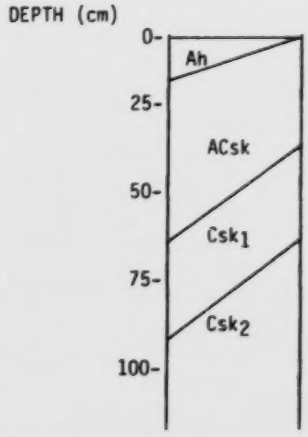
Maynard soils occur on gentle to extreme slopes in the Okanagan Valley, mainly adjacent to Osoyoos, Skaha and Okanagan lakes. Chapman, Munson and Penticton soils are usually closely associated with Maynard soils.

Maynard soils have developed in mostly medium textured, stone-free, glaciolacustrine sediments. Surface and subsurface textures are silt loam or fine sandy loam while subsoils are silt loam or silty clay loam, often containing lenses of silty clay and fine sandy loam. Maynard soils are moderately to strongly calcareous and moderately saline. These Orthic Regosol: calcareous and saline phase soils are well to moderately well drained, moderately to slowly pervious and have moderate to rapid runoff.

The soils are generally not suited for agricultural or urban uses. Adverse topography, high susceptibility to erosion, slow subsoil permeability, low bearing strengths, and high salinity are all major restrictions. Most areas remain under natural vegetation which consists of salt tolerant grasses, sagebrush, rabbitbrush and scattered Ponderosa pine.

The steeply to extremely sloping areas are typical of Maynard soils.

GENERALIZED MAYNARD SOIL PROFILE



Brown (10YR 5.5/3), silt loam or fine sandy loam; weak, fine, subangular blocky structure; very friable consistence; non or weakly calcareous; moderately saline.

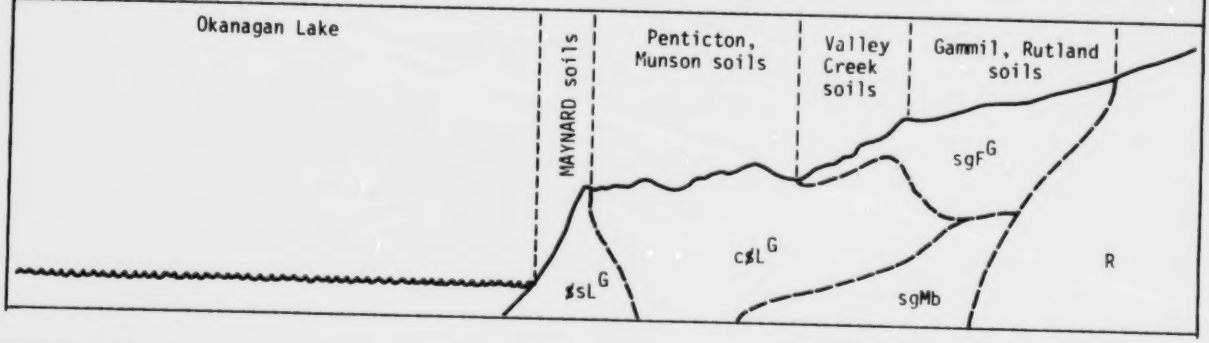
Brown (10YR 5/3), silt loam or fine sandy loam; weak, moderate, subangular blocky structure; very friable consistence; moderately calcareous; moderately saline.

Grayish-brown (2.5Y 5.5/2), very fine sandy loam; massive, breaking to very weak, fine angular blocky peds; very friable consistence; strongly calcareous; moderately saline.

Grayish-brown (2.5Y 5.5/2), interstratified, very fine sandy loam, silt loam and sandy clay; coarse pseudo-platy breaking to weak to moderate, fine to medium angular blocky peds; friable to firm consistence; strongly calcareous; moderately saline.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol; calcareous and saline phases

MAYNARD SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 0-5
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: absent, but side hill seepage may be evident
PERVIOUSNESS CLASS	: moderate to slow
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: variable, dependent on salt concentration
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	ML-SM	CL-SC
AASHO TEXTURE SYMBOL	A-4	A-4
LIQUID LIMIT	25-35 or NP	25-35 or NP
PLASTICITY INDEX	1-5 or NP	1-10 or NP
SHEAR STRENGTH	low to medium	low to medium
SOIL TEXTURE	silt loam or fine sandy loam	interstratified silt loam, silty clay loam and very fine sandy loam
PERMEABILITY	moderate	moderate to slow
AWSC	high	high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0
PASSING # 4	100	100
SIEVES (%) # 40	99-100	100
#200	50-90	50-80

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	8.1-8.8	8.4-8.8
1:2 0.01M $CaCl_2$	7.7-8.5	8.0-8.4
SALINITY CLASS	moderately saline	moderately saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	medium to low	medium to low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	high	high
- K	high	high
BASE SATURATION (%)	100	100
PHOSPHOROUS	low	low
SULFUR	very high	very high

McDOUGALL SOILS (ML)

GENERAL COMMENTS

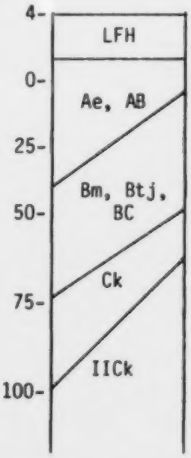
McDougall soils occur near East Kelowna, Lakeview Heights and Westbank on gentle to extreme slopes often in association with Parkill and Harrland soils.

The parent material consists of medium to moderately coarse textured eolian deposits usually between 30 and 100 cm thick overlying glacial till. Surface and subsurface soil textures are fine sandy loam or fine loamy sand. Subsoils are gravelly silt loam or gravelly loam. These Eluviated Eutric Brunisol soils are well drained, moderately pervious and have moderate water holding capacity.

Urban uses are suited to McDougall soils, except where steep slopes are restricting. Significant areas are currently in urban and industrial uses. The more gently sloping areas are well suited for agricultural production and are used mostly for tree fruits and vineyards. Uncleared areas of McDougall soils support open stands of Ponderosa pine and Douglas-fir with various grasses in the understory.

McDougall soils occupy the hilly background while Paradise soils occur in the grassy foreground.

GENERALIZED McDOUGALL SOIL PROFILE



LFH — Semi to well decomposed needles, leaves and other forest litter.

Ae, AB — Pale brown (10YR 6/3), loam or fine sandy loam; weak, medium, platy breaking to weak, very fine granular structure; very friable consistence.

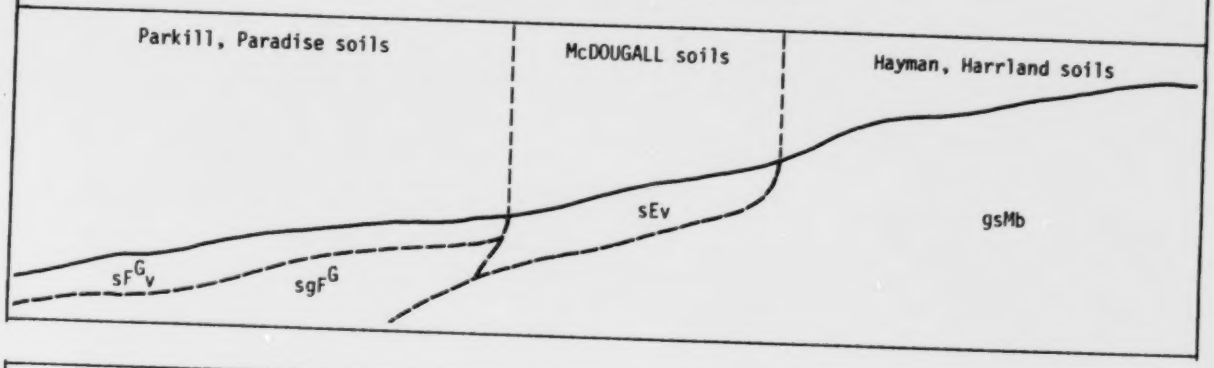
Bm, Btj, BC — Olive yellow (10YR 6/4), fine sandy loam or very fine loamy sand; weak, fine, subangular blocky structure; friable consistence.

Ck — Light gray (2.5Y 6/2), loam; massive, breaking to moderate, medium, angular blocky peds; friable consistence; weakly or moderately calcareous.

IICk — Light gray (2.5Y 6.5/2), gravelly silt loam or gravelly loam; moderate to strong, medium, pseudo-platy structure breaking to moderate to strong angular blocky peds; firm to very firm consistence; moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

McDOUGALL SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: eolian veneer or blanket over glacial till
DEPTH TO FREE LIME (cm)	: 60-85
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM-ML	ML-CL
AASHO TEXTURE SYMBOL	A-4	A-6, A-4
LIQUID LIMIT	10-25 or NP	30-45
PLASTICITY INDEX	0.1-5 or NP	5-15
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	fine sandy loam, loam or fine loamy sand	gravelly silt loam, gravelly loam
PERMEABILITY	moderate to rapid	moderate
AWSC	moderate	moderate
COARSE >7.5 cm (%)	0	0-5
FRAGMENTS <7.5 cm (%)	0	15-35
PASSING # 4	100	30-50
SIEVES (%) # 40	85-95	20-30
#200	50-65	10-20

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.9-7.4	7.0-8.0
1:2 0.01M $CaCl_2$	6.4-7.0	6.6-7.6
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	medium	medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low
- K	high	high
BASE SATURATION (%)	75-95	95-100
PHOSPHOROUS	high	high
SULFUR	low	low

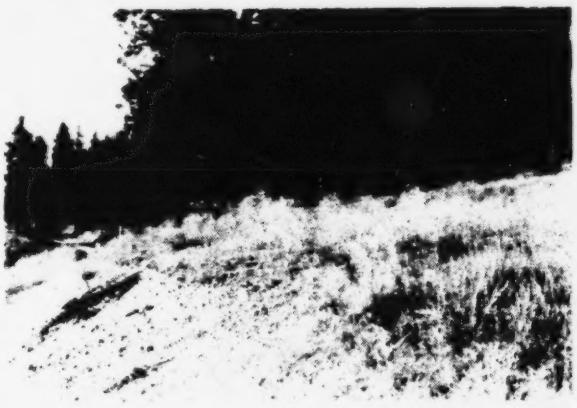
McKINLEY SOILS (MK)

GENERAL COMMENTS

McKinley soils are uncommon in the map area and occur only near McKinley Landing and in the Glenmore Valley. They occupy gentle to extreme slopes, usually in association with Glenmore, Westbank and Gammil soils.

McKinley soils have developed in gravelly coarse textured fluvioglacial materials, usually between 30 and 80 cm thick, and overlie silty, stratified glaciolacustrine sediments. Surface and subsurface textures are gravelly sandy loam or gravelly loamy sand; subsoils are interbedded silt loam, silty clay loam and loamy sand. These Eluviated Eutric Brunisol soils are well drained, moderately to rapidly pervious and have low to moderate water holding capacity.

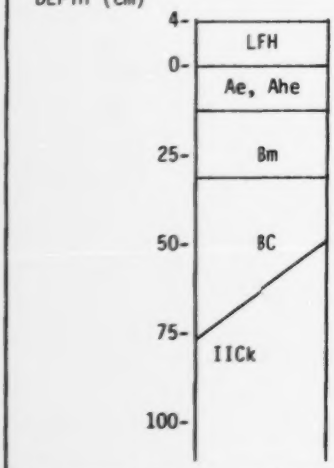
Agricultural suitability is limited by moderate stoniness, low water holding capacity, low fertility in the upper soil, as well as adverse topography. Only a few areas are developed for agricultural uses. Uncleared areas support mainly Ponderosa pine and grass vegetation.



A typical uncleared area of McKinley soils.

McKinley soils are moderately suited for urban uses although downslope seepage of septic tank effluent may occur at the interface of the coarse gravelly upper soil and silty subsoil. Variable bearing strengths in the subsoil may require special foundation considerations.

GENERALIZED McKINLEY SOIL PROFILE



Raw to well decomposed needle, leaves and other forest litter.

Grayish-brown (10YR 5/2), gravelly sandy loam; weak to moderate, very fine subangular blocky structure; slightly hard consistence.

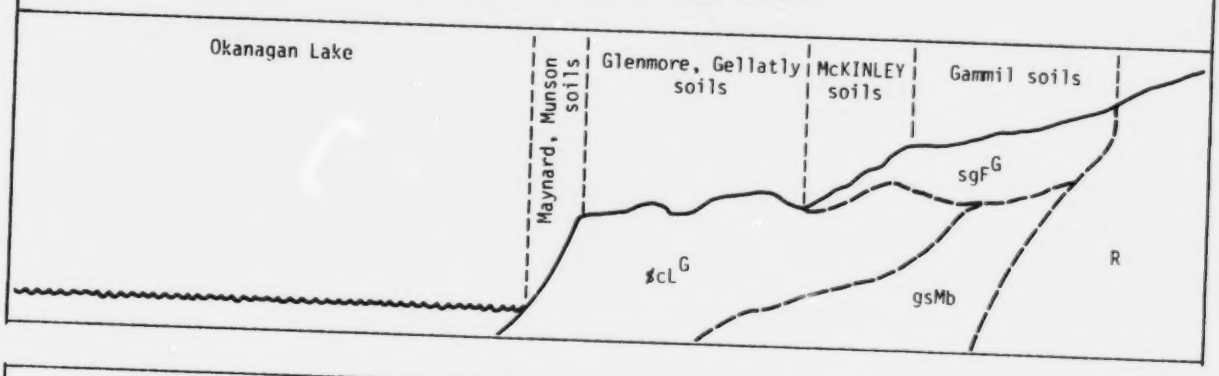
Brown (10YR 5.5/3), very gravelly loamy sand or very gravelly sandy loam; weak, fine subangular blocky structure; loose or soft consistence.

Pale brown (10YR 6/3), gravelly loamy sand; moderate, fine to medium angular blocky structure; single-grain; friable consistence; non to very weakly calcareous.

Light gray (10YR 6.5/2), interbanded silt loam, silty clay loam and loamy sand; moderate, medium, pseudo-platy structure breaking to moderate to very coarse angular blocky peds; very hard consistence; strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

McKINLEY SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial veneer or blanket over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: between 50 and 70
SURFACE STONINESS CLASS	: 1-3
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate to rapid
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	GM-GW	ML-CL
AASHO TEXTURE SYMBOL	A-1; A-2	A-4; A-6, (A-7)
LIQUID LIMIT	NP	30-50
PLASTICITY INDEX	NP	5-15
SHEAR STRENGTH	high to medium	medium to low
SOIL TEXTURE	very gravelly loamy sand, very gravelly sandy loam	banded silt loam, silty clay loam and loamy sand
PERMEABILITY	rapid	moderate to slow
AWSC	low	high
COARSE FRAGMENTS >7.5 cm (%)	5-15	0
COARSE FRAGMENTS <7.5 cm (%)	50-75	0-2
PASSING # 4	30-45	100
SIEVES (%) # 40	10-20	98-100
SIEVES (%) #200	<12	95-98

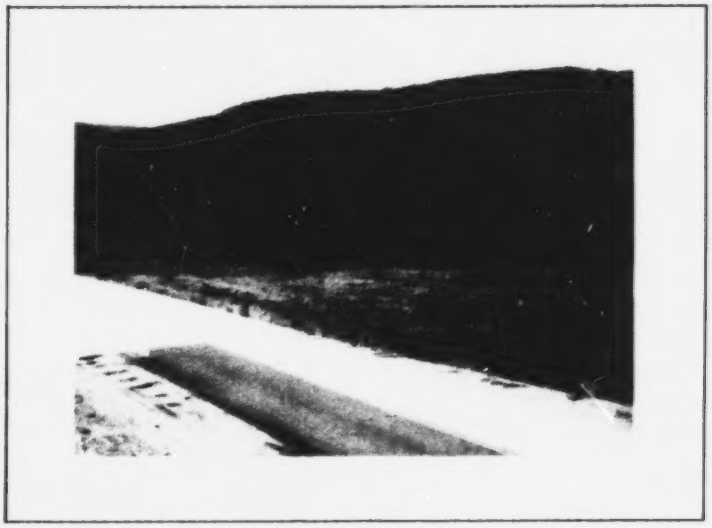
CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.2-6.4	7.7-8.5
1:2 0.01M $CaCl_2$	5.6-5.9	7.2-8.1
SALINITY CLASS	non-saline	non to very weakly saline
ORGANIC CARBON	very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low	medium
EXCHANGEABLE CATIONS - Ca	low	high
- Mg	low	high
- Na	low	low to medium
- K	low	low
BASE SATURATION (%)	70-90	95-100
PHOSPHOROUS	high	low
SULFUR	low	low

MISSION CREEK SOILS (MC)

GENERAL COMMENTS

Mission Creek soils are almost exclusively restricted to the general vicinity of Mission and Daves creeks at about 17 km east of Kelowna. The soils occur at elevations between 730 and 800 meters on gentle to strong slopes and are usually associated with Kalamoir, Gammil and Chapman soils.

These well drained soils have developed in a medium to moderate coarse textured eolian or fluvial veneer, usually between 30 and 80 cm thick, overlying silty stratified glaciolacustrine sediments. Surface and subsurface textures are silt loam or fine sandy loam while the subsoil is interbedded silt loam, silty clay loam and fine sandy loam. These Orthic Dark Brown soils are moderately pervious and have high water holding capacity.

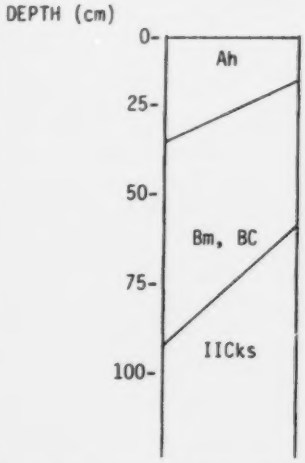


Mission Creek soils occupy the nearly level terrace in the foreground.

The more gently sloping areas of Mission Creek soils are well suited for agricultural uses although relatively cooler temperatures and shorter frost-free periods preclude most tree fruits and grapes. Cleared areas are presently used for grazing and hay production. The natural vegetation consists of open Douglas-fir and Ponderosa pine with various grasses in the understory.

The soils are moderately well suited for urban development; some soil restrictions are low bearing strengths that may need special foundations and inefficient septic tank effluent disposal in the moderately pervious subsoil.

GENERALIZED MISSION CREEK SOIL PROFILE



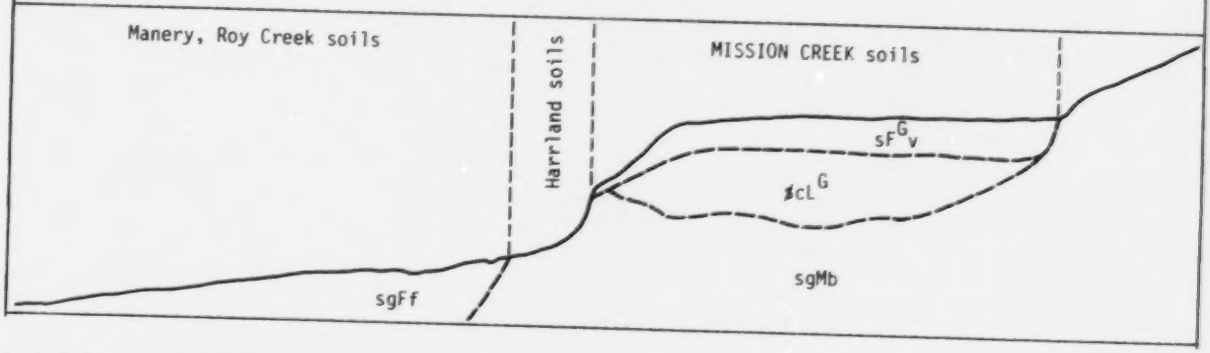
Dark grayish brown (10YR 4/2), very fine sandy loam or silt loam; weak to moderate, very coarse prismatic structure breaking to weak to moderate, medium, subangular blocky peds; friable or very friable consistence.

Brown to pale brown (10YR 5.5/3), very fine sandy loam, loam or silt loam; moderate to strong, fine, angular blocky structure; hard consistence; non or slightly calcareous.

Light brownish gray or light gray (10YR 6.5/2), banded silty clay loam, very fine sandy loam and silt loam; moderate, coarse to very coarse pseudo-platy structure; friable to firm consistence; moderately to strongly calcareous; weakly or moderately saline.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

MISSION CREEK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial and/or eolian veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: between 80 and 100 cm
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM (ML)	ML
AASHO TEXTURE SYMBOL	A-4	A-4
LIQUID LIMIT	15-25 or NP	15-25
PLASTICITY INDEX	1-5 or NP	1-5 or NP
SHEAR STRENGTH	medium	medium to low
SOIL TEXTURE	loam, very fine sandy loam, or silt loam	banded silt, silt loam, very fine sandy loam
PERMEABILITY	moderate	moderate to low
AWSC	high	moderate to high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0
PASSING # 4	100	100
SIEVES (%) # 40	90-100	100
#200	70-90	85-98

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.2-8.1	8.0-9.2
1:2 0.01M $CaCl_2$	5.7-7.6	7.5-8.5
SALINITY CLASS	non-saline	weakly to moderately saline
ORGANIC CARBON	low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low to medium	low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	high
- K	high	high
BASE SATURATION (%)	96-100	low
PHOSPHOROUS	high	100
SULFUR	low	high
		very high

MUNSON SOILS (MU)

GENERAL COMMENTS

Munson soils occupy gentle to extreme slopes in association with Penticton and Chapman soils and mainly occur adjacent to Okanagan and Skaha lakes.

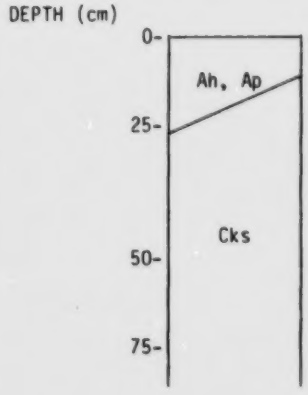
Munson soils have developed in medium-textured, stone-free, silty glaciolacustrine sediments. Surface and subsurface textures are silt loam (sometimes very fine sandy loam) and grade to silt loam with thin bands of loamy fine sand and silty clay loam in the subsoil.

Large areas have been cleared and are utilized for agricultural uses, mainly vineyards and tree fruits. The subsurface and subsoils are moderately saline. Uncleared areas support mostly sagebrush, rabbitbrush and various grasses. Main soil limitations are adverse topography in some areas and susceptibility to erosion.

Restricted subsoil permeability limits efficient septic tank effluent disposal and generally low bearing strengths may require special consideration when constructing foundations.

The moderately sloping, middle part of the photo is typical of areas where Munson soils occur.

GENERALIZED MUNSON SOIL PROFILE

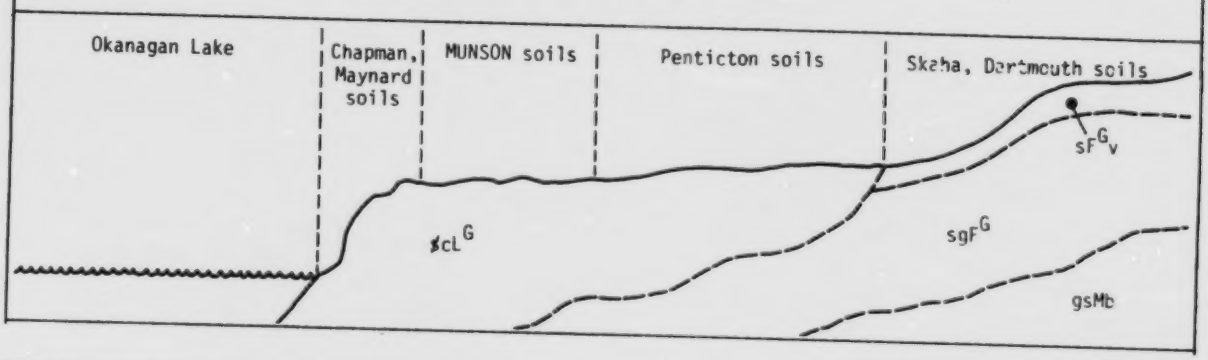


Ah, Ap: Brown (10YR 5/3), silt loam or very fine sandy loam; very weak, medium, platy breaking to weak to moderate, fine subangular blocky structure; slightly hard consistence; non or very weakly calcareous.

Cks: Light gray (10YR 7/1), silt loam containing thin bands of silty clay loam and fine loamy sand; moderate to strong pseudo-platy structure; firm consistence; strongly calcareous; moderately saline.

TAXONOMIC SOIL CLASSIFICATION: Rego Brown: saline phase

MUNSON SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 20
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate to slow
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 25-45; subsoil salinity and compact subsoil
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
UNIFIED TEXTURE SYMBOL	ML-CL	CL-CH
AASHO TEXTURE SYMBOL	A-4	A-4 (A-6; A-7)
LIQUID LIMIT	25-40	30-50
PLASTICITY INDEX	10-20	10-25
SHEAR STRENGTH	medium to low	medium to low
SOIL TEXTURE	silt loam or very fine sandy loam	silt loam with bands of silty clay loam and loamy sand
PERMEABILITY	moderate	moderate to slow
AWSC	high	high
COARSE FRAGMENTS >7.5 cm (%)	0	0
<7.5 cm (%)	0	0-3
PASSING SIEVES (%) # 4	100	100
# 40	100	100
#200	95-100	95-100

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
SOIL REACTION (pH) 1:1 H_2O	7.8-8.0	7.9-8.4
1:2 0.01M $CaCl_2$	7.3-7.5	7.4-7.8
SALINITY CLASS	non-saline	moderately saline
ORGANIC CARBON	low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium	medium
EXCHANGEABLE CATIONS - Ca	very high	very high
- Mg	medium	high
- Na	very low	high
- K	high	high
BASE SATURATION (%)	100	100
PHOSPHOROUS	low	low
SULFUR	low to medium	very high

NARAMATA SOILS (NM)

GENERAL COMMENTS

Naramata soils occur along the east side of Okanagan Lake between Penticton and Naramata and in other small areas between Penticton and Peachland as well as along Skaha Lake. They occupy gentle to strong slopes usually in association with Penticton, Valley Creek, Munson and Skaha soils.

Naramata soils have developed in a sandy fluvial veneer between 50 and 100 cm thick, overlying stratified glaciolacustrine sediments.

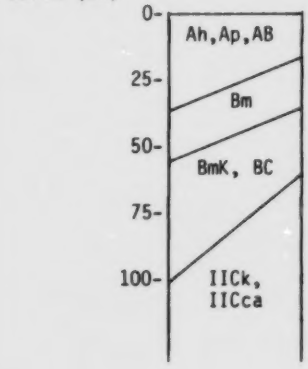
Surface and subsurface soil textures are sandy loam or loamy sand while the subsoils are interbedded silt loam, silty clay loam and fine loamy sand. These Orthic Brown soils are well drained, moderately pervious and have moderate water holding capacity.

Naramata soils are well to moderately suited for agricultural uses and most gently and moderately sloping areas are planted to orchards and vineyards. Natural vegetation consists of sagebrush, rabbitbrush, various grasses and scattered Ponderosa pine.

Restrictions for urban uses are variable soil bearing strengths in the silty subsoil as well as adverse topography in some areas.

Naramata soils occur on moderate slopes usually in association with Penticton soils.

GENERALIZED NARAMATA SOIL PROFILE



Grayish-brown (10YR 5/2), sandy loam or loamy sand; weak, medium, subangular blocky structure; friable consistence.

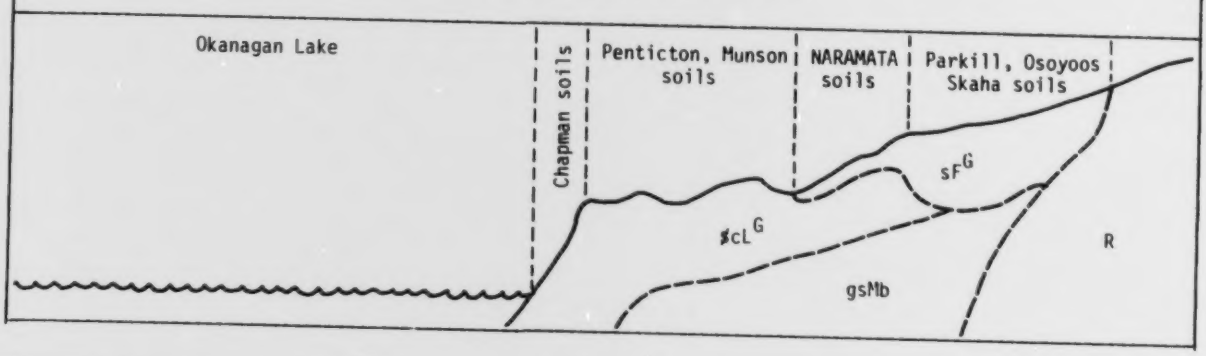
Pale brown or brown (10YR 5.5/3), loamy sand or sandy loam; weak to moderate, fine subangular blocky structure; friable consistence.

Pale brown (10YR 6.5/3), sandy loam or loam; moderate, medium, subangular blocky structure; weakly to moderately calcareous; weakly saline.

Light brownish gray or pale brown (10YR ö/2.5), silt loam containing thin bands of silty clay loam and loamy sand; moderate to strong, medium to coarse pseudo-platy structure breaking to moderate, fine, angular blocky peds; strongly calcareous; weakly saline.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

NARAMATA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 50; variable
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: >75; compact subsoil
TOPOGRAPHY	: gentle to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	SM	SM-ML	ML
AASHO TEXTURE SYMBOL	A-3; A-4	A-3; A-4	A-4
LIQUID LIMIT	NP	NP	25-35
PLASTICITY INDEX	NP	NP	1-5
SHEAR STRENGTH	medium	medium	medium to low
SOIL TEXTURE	sandy loam, loamy sand	sandy loam to silt loam	banded silt loam, silty clay loam and fine sandy loam
PERMEABILITY	rapid to very rapid	moderate to rapid	moderate to slow
AWSC	moderate to low	moderate	high
COARSE >7.5 cm (%)	0	0	0
FRAGMENTS <7.5 cm (%)	0-8	0-10	0
PASSING # 4	95-100	95-100	98-100
SIEVES (%) # 40	25-60	25-60	90-100
#200	3-10	6-15	80-100

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	6.1-6.8	6.9-8.0	8.3-8.5
1:2 0.01M $CaCl_2$	5.6-6.3	6.4-7.6	7.8-8.2
SALINITY CLASS	non-saline	non to weakly saline	weakly saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	low to very low	very low	very low
EXCHANGE CAPACITY	low	low	low to very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	medium	low	medium
- Na	low	low	low
- K	high	low	low
BASE SATURATION (%)	95-100	100	100
PHOSPHOROUS	low	low	low
SULFUR	low	moderately high	high

NIGHTHAWK SOILS (NG)

GENERAL COMMENTS

Nighthawk soils are common on the floodplain of the Lower Similkameen River and in a small area near Vaseaux Lake. They occur in association with Kinney, Iltcoola, Snehumpton and Susap soils and are found on nearly level or very gentle slopes.

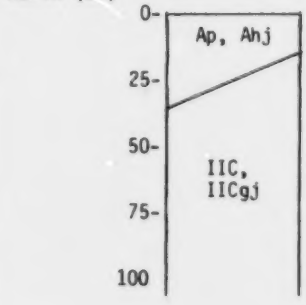
Nighthawk soils have developed in a shallow (10 to 25 cm thick), sandy fluvial veneer which overlies very gravelly fluvial deposits. Surface textures are sand or loamy sand while subsurface and subsoil textures are stony, very gravelly loamy sand or very gravelly sand. These Orthic Regosol soils are rapidly drained, rapidly pervious and have low water holding capacity. Water tables fluctuate with water levels in the adjacent river and flooding may occur during higher than normal runoff.

Most areas of Nighthawk soils are uncleared and have vegetation dominantly consisting of black cottonwood, willows, some grasses and scattered Ponderosa pine. Cleared and cultivated areas are either planted to orchards, used for hay production or utilized for pasture.

Nighthawk soils occur along the left river bank.

Low water holding capacity and potential flooding (in undyked areas) are the main restrictions for agricultural crop production. The danger of flooding and incomplete sewage effluent filtration by the coarse subsoil textures are severe urban limitations.

GENERALIZED NIGHTHAWK SOIL PROFILE

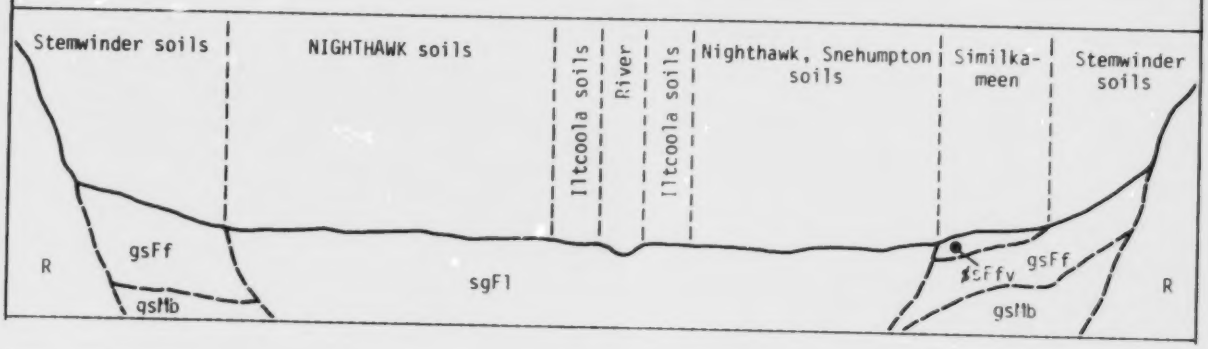


Grayish-brown to dark grayish brown (10YR 4.5/2), sand or loamy sand; weak, very fine, granular structure; slightly hard consistence; non or weakly calcareous.

Pale-brown (10YR 6/3) to light gray (2.5Y 6.5/1), very gravelly sand or very gravelly loamy sand; single-grain; loose consistence.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol

NIGHTHAWK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0-1
DEPTH TO WATERTABLE (m)	: fluctuates from about 50 cm to >2 m
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: 25; very gravelly subsoil
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
UNIFIED TEXTURE SYMBOL	SM	GM
AASHO TEXTURE SYMBOL	A-2-4, A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sand, loamy sand	very gravelly loamy sand, very gravelly sand
PERMEABILITY	very rapid	very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	0-2	10-20
FRAGMENTS <7.5 cm (%)	0-5	60-90
PASSING # 4	98-100	30-50
SIEVES (%) # 40	30-80	10-30
#200	2-8	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
SOIL REACTION (pH) 1:1 H_2O	7.4-7.8	7.0-7.4
1:2 0.01M $CaCl_2$	7.0-7.4	6.9-7.1
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to moderate	low to very low
NITROGEN	low	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	high	medium
- Mg	high	low
- Na	very low	low
- K	high	low
BASE SATURATION (%)	98-100	98-100
PHOSPHOROUS	low	very low
SULFUR	low to medium	low

NKWALA SOILS (NK)

GENERAL COMMENTS

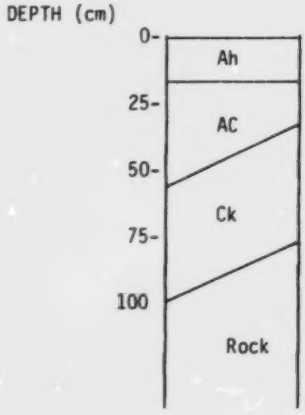
Nkwala soils occur in association with Faulder and Gammil soils and rock outcrops near Okanagan Falls and Summerland. They occupy moderate to very steep slopes on the upper bedrock ridges and knobs in the landscape.

The parent material consists of a mixture of stony, coarse textured colluvium and some glacial till between 50 and 150 cm thick which overlies metamorphic and/or volcanic bedrock. Surface and subsurface textures are stony, very gravelly sandy loam or very gravelly loamy sand. These Rego Dark Brown: lithic phase soils are well to rapidly drained, rapidly pervious and have a low water storage capacity.

Nkwala soils are generally not suited for agricultural cropping because of adverse topography, stoniness and shallowness to bedrock. They are poorly suited for urban uses for the same reasons. Native vegetation dominantly consists of scattered Ponderosa pine and Douglas-fir, various grasses, and sagebrush. Limited natural grazing is available.

The steeply sloping area is typical of the shallow to bedrock Nkwala soils.

GENERALIZED NKWALA SOIL PROFILE



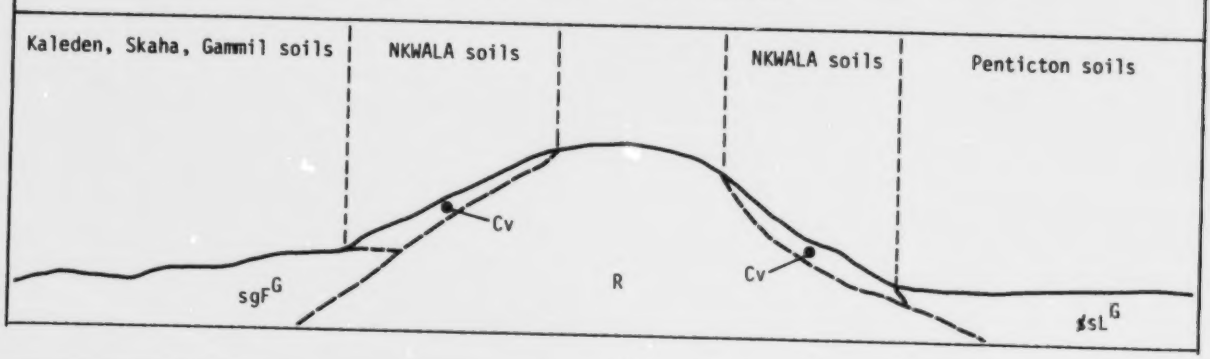
Dark grayish brown (10YR 4/2), stony, very gravelly (angular) loamy sand or very gravelly sandy loam; weak, very fine, subangular blocky structure; soft consistence; weakly calcareous.

Pale brown (10YR 6/3), very gravelly (angular) loamy sand or very gravelly sandy loam; weak, fine to very fine subangular blocky structure; soft consistence.

Pale brown or light yellowish brown (10YR 5.5/3.5), very gravelly loamy sand or very gravelly sandy loam; single-grain or weak, fine subangular blocky structure; loose to very friable consistence; moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Rego Dark Brown: lithic phase

NKWALA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: 0.5 to 1.5
PARENT MATERIAL	: colluvial veneer over bedrock
DEPTH TO FREE LIME (cm)	: 75
SURFACE STONINESS CLASS	: 3-5
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: 50 to 150; bedrock
TOPOGRAPHY	: gentle to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	GW-GM	GP-GW	
AASHO TEXTURE SYMBOL	A-1; A-2-4	A-1; A-2-4	
LIQUID LIMIT	NP	NP	
PLASTICITY INDEX	NP	NP	
SHEAR STRENGTH	high	high	
SOIL TEXTURE	very gravelly loamy sand, very gravelly sandy loam	very gravelly loamy sand, very gravelly sandy loam	BEDROCK
PERMEABILITY	very rapid	very rapid	
AWSC	very low to low	very low	
COARSE >7.5 cm (%)	0-5	0-5	
FRAGMENTS <7.5 cm (%)	50-90	50-90	
PASSING # 4	10-50	10-50	
SIEVES (%) # 40	20-30	20-30	
#200	5-15	5-15	

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	8.0-8.4	8.4-8.8	
1:2 0.01M $CaCl_2$	7.5-7.9	7.9-8.3	
SALINITY CLASS	non-saline	non-saline	
ORGANIC CARBON	low	very low	
NITROGEN	low to very low	very low	
EXCHANGE CAPACITY	medium to low	low to medium	
EXCHANGEABLE CATIONS - Ca	high	high	
- Mg	medium	medium	BEDROCK
- Na	very low	very low	
- K	very high	high	
BASE SATURATION (%)	100	100	
PHOSPHOROUS	medium	medium	
SULFUR	low	low	

OLALLA SOILS (OL)

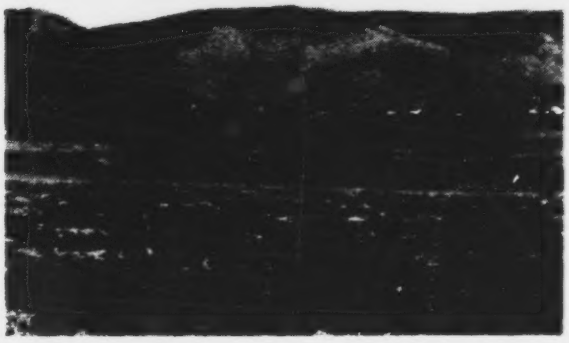
GENERAL COMMENTS

Olalla soils only occur north of Keremeos where they occupy nearly level and very gentle slopes and are associated with Stemwinder, Dartmouth and Rutland soils.

Olalla soils have developed in a medium to moderately fine textured fluvial veneer between 50 and 100 cm thick overlying coarse-textured fluvial fan deposits. Surface and subsurface textures are silt loam, silty clay loam or loam while the subsoil textures are gravelly loam or gravelly sandy loam. These Orthic Dark Brown soils are well drained, moderately pervious, have slow surface runoff and high to moderate water storage capacity.

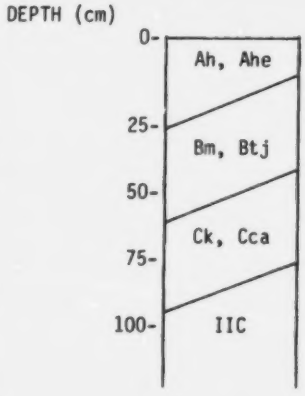
Olalla soils are well suited for most agricultural crops. Most areas are cleared and used for vegetable, tree fruits or alfalfa production. The natural vegetation in few uncleared areas consists of grasses, sagebrush and rabbitbrush.

The soils have no limitations for urban or related uses.



Olalla soils occupy the gentle slope in the foreground to central part of the photo.

GENERALIZED OLALLA SOIL PROFILE



Brown to dark brown (10YR 4/3), silt loam or silty clay loam; moderate to strong, fine subangular blocky structure; firm consistence.

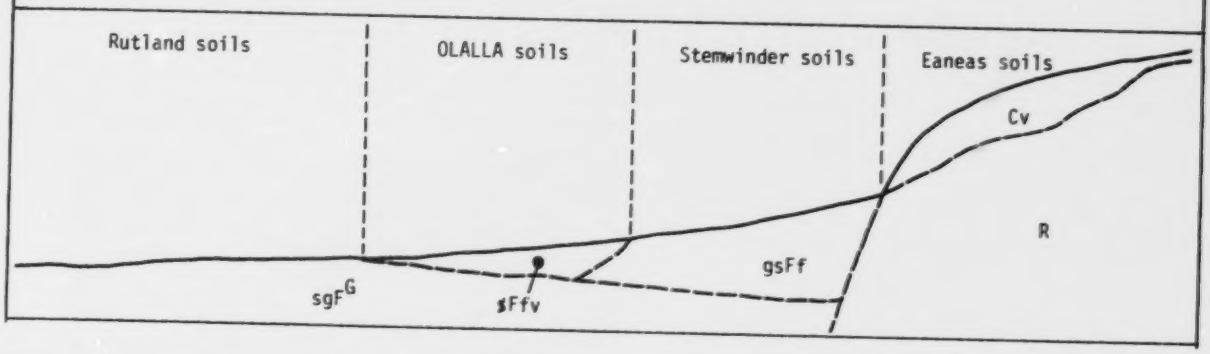
Brown to dark yellowish brown (10YR 4.5/4), silt loam or silty clay loam; weak, coarse prismatic breaking to moderate to strong, medium, subangular blocky structure; hard consistence.

Pale brown (10YR 6/3), silt loam or loam; moderate to strong, coarse subangular blocky structure; firm consistence; moderately to strongly calcareous.

Gray (5Y 6/1), gravelly loamy sand or gravelly sand; single-grain; loose consistence.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

OLALLA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial fan deposits
DEPTH TO FREE LIME (cm)	: 50
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-100 cm	>100 cm
UNIFIED TEXTURE SYMBOL	MH, ML	MH, ML	GP, SP
AASHO TEXTURE SYMBOL	A-7; A-6	A-7; A-6	A-3; A-2
LIQUID LIMIT	30-50	20-40	NP
PLASTICITY INDEX	15-25	10-20	NP
SHEAR STRENGTH	low to medium	medium to low	medium to high
SOIL TEXTURE	silt clay loam, silty clay	silty clay loam	gravelly loamy sand, gravelly sand
PERMEABILITY	moderate	moderate	very rapid
AWSC	high	high	low
COARSE >7.5 cm (%)	0-2	0-5	0-5
FRAGMENTS <7.5 cm (%)	0-10	0-10	20-50
PASSING # 4	100	95-100	30-60
SIEVES (%) # 40	95-100	80-100	5-20
#200	85-95	70-90	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-100 cm	>100 cm
SOIL REACTION (pH) 1:1 H_2O	7.6-8.0	8.0-8.2	7.6-8.0
1:2 0.01M $CaCl_2$	7.2-7.6	7.6-7.9	7.0-7.4
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	moderate	low	very low
NITROGEN	medium	very low	very low
EXCHANGE CAPACITY	high	medium	low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	medium
- Na	very low	very low	very low
- K	very high	high	low
BASE SATURATION (%)	98-100	100	100
PHOSPHOROUS	medium to high	medium	low to medium
SULFUR	moderately high	moderately high	moderately high

OLHAUSEN SOILS (OH)

GENERAL COMMENTS

Olhausen soils occur adjacent to Skaha and Okanagan lakes and near Summerland on very gentle to extreme slopes in association with Penticton, Munson and Chapman soils.

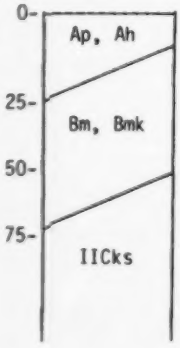
The soils have developed in a moderately coarse textured, stone-free, eolian veneer between 10 and 60 cm thick and overlie stratified silty and sandy glaciolacustrine sediments. Surface and subsurface textures are usually sandy loam or fine sandy loam and occasionally loamy sand. The moderately to weakly saline subsoil is silt loam or silty clay loam with lenses of loamy sand. These Orthic Brown: saline phase soils are well to rapidly drained, moderately pervious and have slow surface runoff. The upper soil has a low to moderate water holding capacity.

Olhausen soils are generally well suited for agricultural uses although adverse topography occurs in some areas. Most areas are cleared, cultivated and planted to tree fruits and vineyards. Small uncleared areas support various grasses, sagebrush, rabbitbrush and on steep slopes, scattered Ponderosa pine.

Olhausen soils occupy the terrace in the central portion of the photo.

Urban and similar uses are moderately well suited for these soils. Occasional steep slopes and variable bearing strengths may require special foundation construction. The silty glaciolacustrine subsoil has a relatively slow permeability which may restrict septic tank effluent disposal.

GENERALIZED OLHAUSEN SOIL PROFILE



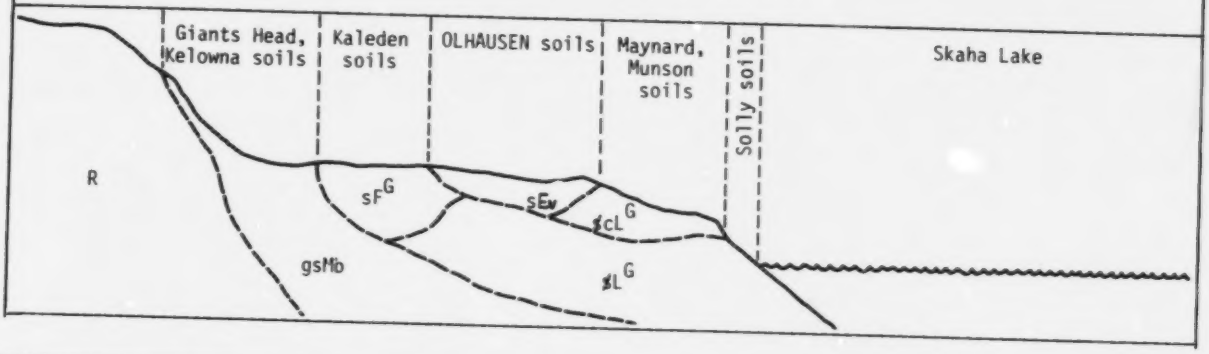
Brown (10YR 5/3), fine sandy loam or loamy sand; very weak, medium, subangular blocky structure; soft consistence; non to weakly calcareous.

Pale brown or light yellowish brown (10YR 6/3.5), fine sandy loam; weak, fine to medium, subangular blocky structure; soft consistence; weakly to moderately calcareous; weakly saline.

Pale brown (10YR 6/2 - 6.5/3.5), banded silt loam and loamy sand; moderate, medium to coarse pseudo-platy structure breaking to moderate, fine, angular blocky peds; hard to very hard consistence; moderately calcareous; moderately to weakly saline.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown: saline phase

OLHAUSEN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: eolian veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 25
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: 60; moderate salinity and compact subsoil
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM-SP	ML-SM	ML
AASHO TEXTURE SYMBOL	A-4	A-3; A-4	A-4
LIQUID LIMIT	NP	NP	15-30
PLASTICITY INDEX	NP	NP	0.1-5
SHEAR STRENGTH	medium	medium to low	medium to low
SOIL TEXTURE	fine sandy loam, sandy loam	fine sandy loam, sandy loam	silt loam with thin lenses of loamy sand
PERMEABILITY	moderate	moderate	moderate to rapid
AWSC	moderate	moderate	moderate
COARSE FRAGMENTS >7.5 cm (%)	0	0	0
<7.5 cm (%)	0	0	0
PASSING # 4	100	100	100
SIEVES (%) # 40	98-100	98-100	98-100
#200	95-98	90-98	95-100

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	8.0-8.3	8.1-8.4	8.2-8.4
1:2 0.01M $CaCl_2$	7.4-7.8	7.6-7.9	7.8-8.0
SALINITY CLASS	non-saline	very weakly saline	weakly to mod. saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	very low	very low	very low
EXCHANGE CAPACITY	low	low to very low	very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	medium	high	high
- Na	very low	very low	medium
- K	moderately high	moderately high	moderately high
BASE SATURATION (%)	100	100	100
PHOSPHOROUS	low to medium	very low	very low
SULFUR	low to medium	very high	very high

OSOYOOS SOILS (O)

GENERAL COMMENTS

Osoyoos soils occur in the south Okanagan area from Oliver to the United States border where they occupy nearly level to strong slopes in association with Haynes, Rutland and Naramata soils.

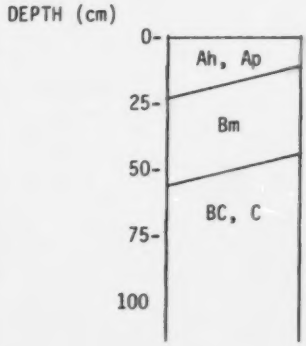
Osoyoos soils have developed in deep, stone-free, sandy fluvioglacial deposits which in some areas are underlain at greater than 2 metre depths by silty glaciolacustrine sediments. These Orthic Brown soils are rapidly drained, rapidly pervious and have low to very low water holding capacity.

Osoyoos soils are moderately well suited for agricultural uses. The main limitations are droughtiness (low water holding capacity) and low natural fertility. Exposed soils in some areas are also susceptible to wind erosion. Natural vegetation consists of a few grasses, antelope bush, sagebrush and rabbitbrush. Under cultivation the soils are planted to orchards and vineyards.

A typical area of undeveloped Osoyoos soils near Osoyoos Lake.

The soils are moderately well suited for urban development, however, adverse topography may sometimes be restricting. Incomplete septic effluent filtration by these coarse textured soils is probable and may lead to groundwater contamination.

GENERALIZED OSOYOOS SOIL PROFILE



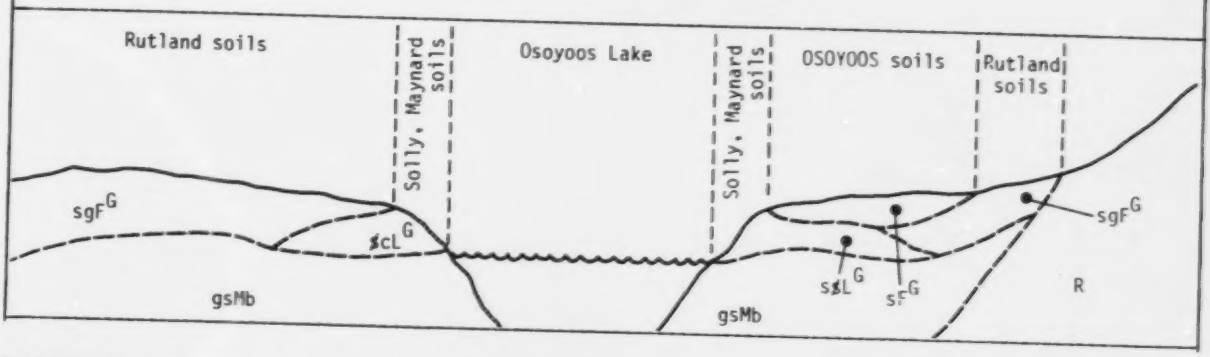
Pale brown to brown (10YR 5.5/3), loamy sand; weak, fine, subangular blocky structure; soft consistence.

Light yellowish brown (10YR 5.5/4.5), loamy sand; weak to moderate, medium, subangular blocky structure; very friable consistence.

Light yellowish brown (10YR 6/4), medium to coarse sand; single-grain; loose consistence; non to weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

OSOYOOS SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >75
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM-SP	SP-SM
AASHO TEXTURE SYMBOL	A-3	A-3
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	loamy sand, sandy loam	medium to coarse sand
PERMEABILITY	very rapid to rapid	very rapid
AWSC	low to very low	very low
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0-2	0-5
PASSING # 4	100	100
SIEVES (%) # 40	50-70	50-70
#200	5-15	2-10

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	6.3-7.8	7.8-8.3
1:2 0.01M $CaCl_2$	5.7-7.3	7.3-7.7
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low to very low	very low
EXCHANGEABLE CATIONS - Ca	medium to high	high
- Mg	medium	low
- Na	very low	very low
- K	very low	very low
BASE SATURATION (%)	80-90	100
PHOSPHOROUS	low	low
SULFUR	low to medium	low

OYAMA SOILS (OY)

GENERAL COMMENTS

Oyama soils occupy scattered locations throughout the Okanagan Valley, mainly near Summerland, Rutland, East Kelowna and Ellison. They occupy very gentle to extreme slopes, usually in association with Dartmouth, Trout Creek and Rutland soils.

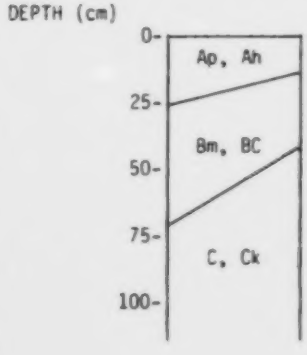
Oyama soils have developed in deep, gravel-free, sandy fluvioglacial deposits. Surface and subsurface textures are sandy loam and loamy sand while subsoils are loamy sand or sand. These Orthic Dark Brown soils are rapidly drained, rapidly pervious and have low water storage capacity.

Where topography is not limiting, Oyama soils are well suited for agricultural crops; low soil water and nutrient holding capacities are limiting. Cultivated and irrigated areas are mainly planted to tree fruits and vineyards. The natural vegetation consists of a variety of native grasses and sagebrush with scattered Ponderosa pine.

The soils are moderately well suited for urban and related uses although incomplete effluent filtration in the sandy subsoils may cause groundwater contamination.

A typical view of Oyama soils being used for orchards near Ellison.

GENERALIZED OYAMA SOIL PROFILE



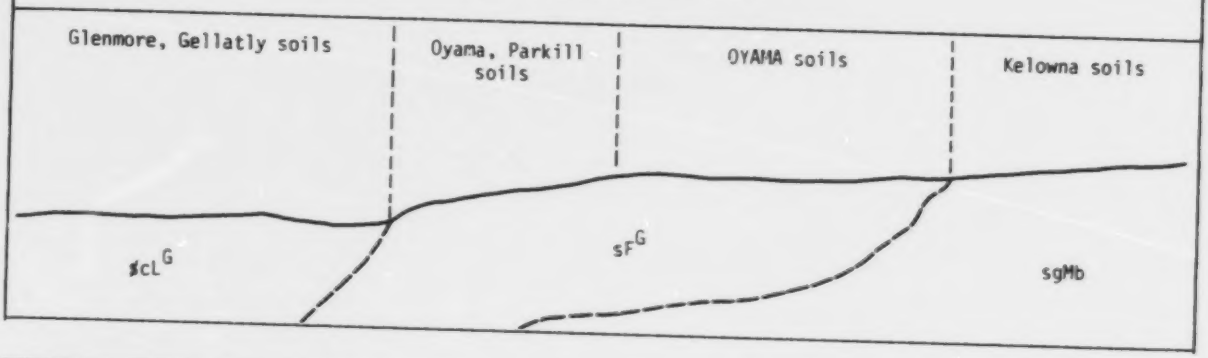
Dark grayish brown (10YR 4/2), sandy loam or loamy sand; weak, fine, subangular blocky structure; very friable consistence.

Brown (10YR 4.5/2.5), sandy loam or loamy sand; weak, fine, subangular blocky structure; friable consistence; non or very weakly calcareous.

Pale brown (10YR 6/3), loamy sand or sand; single-grain; very friable consistence; weakly to moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

OYAMA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 60-75
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: very gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-60 cm	>60 cm
UNIFIED TEXTURE SYMBOL	SM	SM
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-4
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	sandy loam, loamy sand	loamy sand, sand
PERMEABILITY	rapid	very rapid
AWSC	low	low to very low
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0
PASSING # 4	100	100
SIEVES (%) # 40	90-95	50-70
#200	10-20	5-15

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-60 cm	>60 cm
SOIL REACTION (pH) 1:1 H_2O	7.3-8.0	8.0-9.0
1:2 0.01M $CaCl_2$	6.8-7.8	7.5-8.3
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	high	very high
- Mg	medium	low to medium
- Na	low	high
- K	high	medium
BASE SATURATION (%)	85-100	100
PHOSPHOROUS	high	medium
SULFUR	low	low

PANDOZY SOILS (PY)

GENERAL COMMENTS

Pandozy soils only occur on the Mission Creek fan near Kelowna where they occupy nearly level and very gentle slopes in association with Cameron Lake, Priest Creek and Rutland soils.

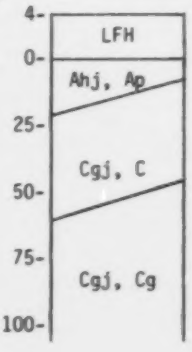
Pandozy soils have developed in stony and gravelly coarse-textured fluvial fan deposits. Soil textures throughout the profile range from very gravelly loamy sand to gravelly sand. These Gleyed Regosol soils are imperfectly to moderately well drained and rapidly pervious.

The soils are generally poorly suited for agricultural use because of stonines and very low water storage capacity. A few areas have been cleared and are used for pasture. The natural vegetation consists of black cottonwood, aspen, willows, Douglas-fir and Ponderosa pine.

Soil bearing strengths are good but basements and other excavations may be difficult to construct because of the stony and gravelly subsoil. Incomplete septic effluent filtration in the very coarse subsoil may contaminate the groundwater supply.

A typical area of undeveloped Pandozy soils near Kelowna.

GENERALIZED PANDOZY SOIL PROFILE



LFH — Raw to well decomposed needles, leaves and other forest litter.

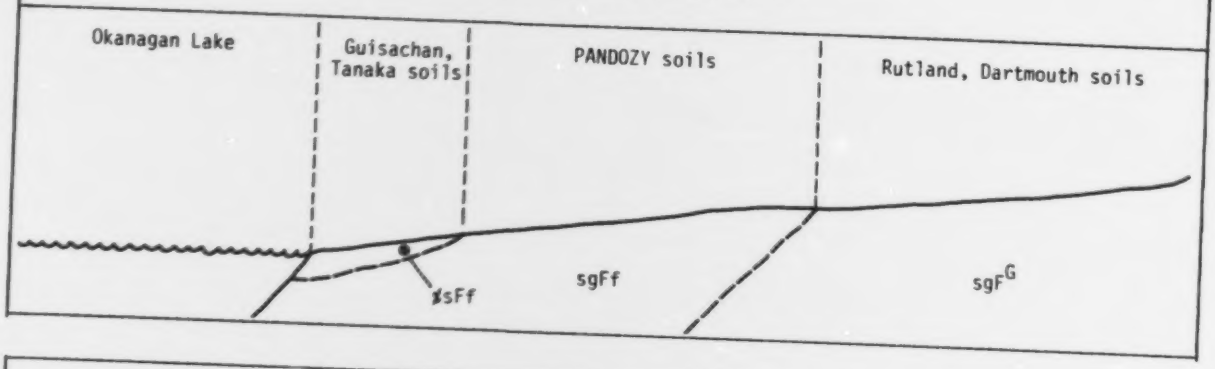
Ahj, Ap — Dark brownish gray (10YR 4/2) to light brownish gray (10YR 6/2.5), very gravelly loamy sand or very gravelly sand; single-grain; loose consistence.

Cgj, C — Pale brown (10YR 6.5/3), very gravelly sand; single-grain; loose consistence; common, faint, fine yellowish-brown (10YR 5/5) mottles.

Cgj, Cg — Very pale brown to light brownish gray (10YR 6.5/2.5), very gravelly sand; single-grain; loose consistence; common to many, coarse, prominent yellowish-brown (10YR 5/5) mottles.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

PANDOZY SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0-3
DEPTH TO WATERTABLE (m)	: fluctuates between 1.0 m and 2.0 m
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: dominantly imperfect; ranging to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 120; water table
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH
	0-100+ cm
UNIFIED TEXTURE SYMBOL	GP-GW
AASHO TEXTURE SYMBOL	A-1
LIQUID LIMIT	NP
PLASTICITY INDEX	NP
SHEAR STRENGTH	high
SOIL TEXTURE	very gravelly loamy sand; very gravelly sand
PERMEABILITY	very rapid
AWSC	very low
COARSE >7.5 cm (%)	10-30
FRAGMENTS <7.5 cm (%)	50-70
PASSING # 4	10-20
SIEVES (%) # 40	5-10
#200	<1

CHEMICAL SOIL PROPERTIES	SOIL DEPTH
	0-100+ cm
SOIL REACTION (pH) 1:1 H_2O	7.0-7.4
1:2 0.01M $CaCl_2$	6.5-6.9
SALINITY CLASS	non-saline
ORGANIC CARBON	low to very low
NITROGEN	low to very low
EXCHANGE CAPACITY	low to very low
EXCHANGEABLE CATIONS - Ca	medium to high
- Mg	low
- Na	very low
- K	high
BASE SATURATION (%)	100
PHOSPHOROUS	low to medium
SULFUR	low

PARADISE SOILS (PE)

GENERAL COMMENTS

Paradise soils occur in the Okanagan Valley mainly near Oliver, Okanagan Falls, West Summerland and East Kelowna. They occupy on nearly level to strong slopes, usually in association with Parkill, Gammil and Dartmouth soils.

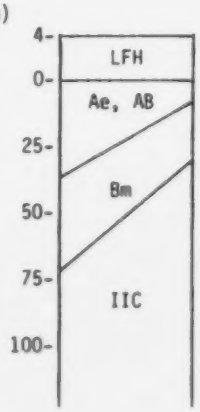
Paradise soils have developed in sandy (fluvial or eolian) veneer between 25 and 60 cm thick, overlying gravelly fluvioglacial deposits. Surface and subsurface textures are sandy loam or loamy sand; subsoils are very gravelly sand or very gravelly loamy sand. These Eluviated Eutric Brunisol soils are rapidly drained, have low water storage capacity, are rapidly pervious and have slow surface runoff.

Paradise soils are well suited for agriculture although low water holding capacity is a restriction. Cultivated and irrigated sites are planted to tree fruits, vineyards or are used for intensive vegetable production. Natural vegetation consists of Ponderosa pine with Douglas-fir and grass in the understory.

Paradise soils occupy the upper parts of the undulations in the foreground and central part of the photo. Parkill soils occur in the intervening swales.

The soils are well suited for urban and related uses. They have adequate bearing strength and drainage; however, coarse subsoil textures may result in incomplete septic effluent filtration.

GENERALIZED PARADISE SOIL PROFILE



Raw to well decomposed needles, leaves and other forest litter.

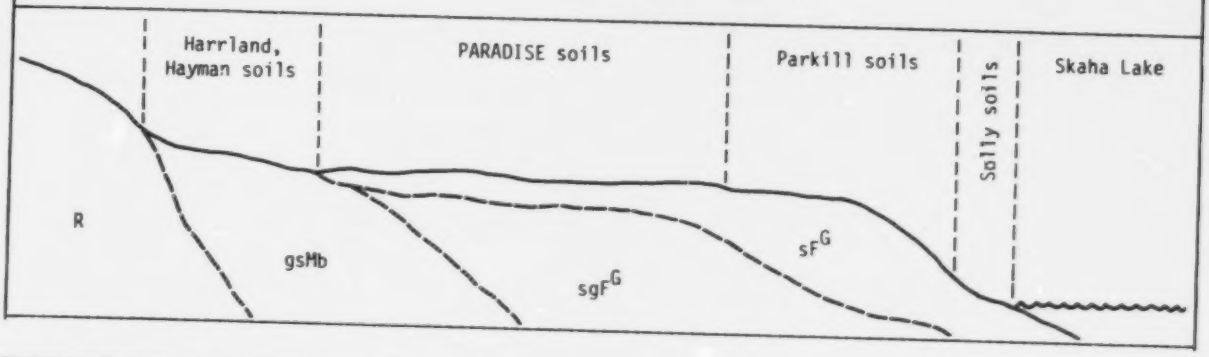
Brown (10YR 5/3), sandy loam or loamy sand; weak to moderate, fine, platy structure breaking to weak to moderate, fine subangular blocky peds; very friable consistence.

Brown to yellowish-brown (10YR 5.5/3 - 5.5/4), sandy loam or loamy sand; weak to moderate, medium, subangular blocky structure; very friable consistence.

Light gray (10YR 7.5/1 - 6.5/2.5), gravelly or very gravelly sand; single-grain; loose consistence; non or weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

PARADISE SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0-1
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM	GP-GM
AASHO TEXTURE SYMBOL	A-2-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly sand, gravelly loamy sand
PERMEABILITY	rapid	very rapid
AWSC	low to moderate	very low
COARSE >7.5 cm (%)	0-2	10-25
FRAGMENTS <7.5 cm (%)	0-5	30-80
PASSING # 4	95-100	50-80
SIEVES (%) # 40	50-75	1-5
#200	5-10	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	7.1-7.5	7.5-8.2
1:2 0.01M $CaCl_2$	6.6-6.9	7.0-7.4
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	low to medium	very low
EXCHANGEABLE CATIONS - Ca	high	medium
- Mg	high	medium
- Na	low	low
- K	high	medium
BASE SATURATION (%)	75-100	96-100
PHOSPHOROUS	low	medium
SULFUR	medium	medium

PARKILL SOILS (PR)

GENERAL COMMENTS

Parkill soils occur throughout the Okanagan Valley near Oliver, Okanagan Falls, West Summerland, Westbank and East Kelowna. They occur on very gentle to strong slopes in association with Haynes, Paradise, Trout Creek and Gammil soils.

These Eluviated Eutric Brunisol soils have developed in deep, sandy, fluvioglacial deposits. Surface and subsurface textures are sand or loamy sand; subsoil textures are sand or very occasionally gravelly sand. The soils are rapidly drained, rapidly pervious, have low water holding capacity and slow surface runoff.

Parkill soils are well suited for agricultural uses although low water and nutrient holding capacities are major limitations. Cleared and cultivated areas are currently mostly used for orchards and vineyards. Vegetation in uncleared areas consists of Ponderosa pine, Douglas-fir, and grass in the the understory.

The soils occur on moderate slopes in East Kelowna.

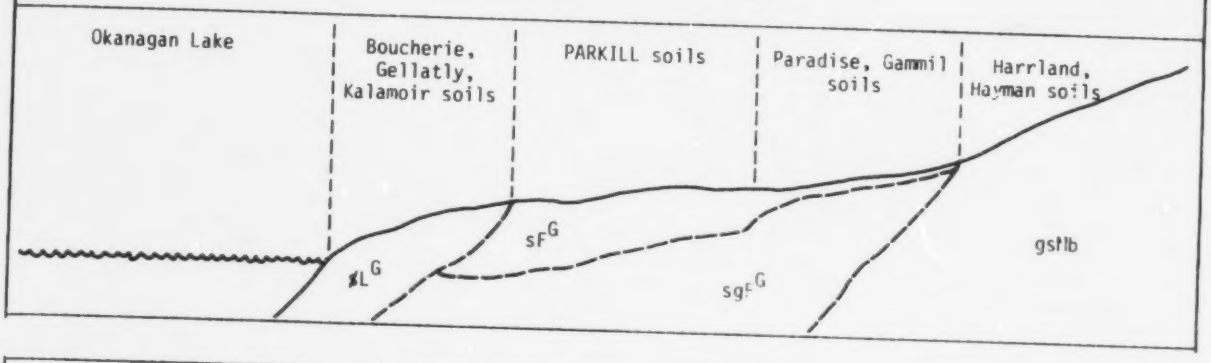
The soils are moderately well suited for urban and other related uses. The subsoil provides adequate bearing strength; however, incomplete septic tank effluent filtration may occur due to the coarse subsoil.

GENERALIZED PARKILL SOIL PROFILE

DEPTH (cm)		
4-0	LFH	Raw to well decomposed needles, leaves and other forest litter.
0-25	Ae, AB	Pale brown (10YR 6.5/3 to 10YR 3.5/5.5), loamy sand or sand; single-grain; loose consistence.
25-50	Bm, Btj, BC	Brown (10YR 5/3), loamy sand or sand; weak to moderate, medium, subangular blocky structure; very friable consistence.
50-75	C	Very pale brown (10YR 6.5/3 - 7/3), sand; single-grain; loose consistence; non or weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

PARKILL SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: very gentle to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-100 cm	>100 cm
UNIFIED TEXTURE SYMBOL	SM	SM
AASHO TEXTURE SYMBOL	A-2-4	A-2-4
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	medium
SOIL TEXTURE	loamy sand or sand	sand
PERMEABILITY	rapid to very rapid	very rapid
AWSC	low	low to very low
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0-5	0-5
PASSING # 4	100	100
SIEVES (%) # 40	50-75	50-70
#200	10-20	5-15

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-100 cm	>100 cm
SOIL REACTION (pH) 1:1 H_2O	6.9-7.5	7.3-7.9
1:2 0.01M $CaCl_2$	6.4-7.1	6.8-7.4
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	medium	medium
- Mg	low	low
- Na	low	low
- K	low	low
BASE SATURATION (%)	70-95	95-100
PHOSPHOROUS	low	low
SULFUR	low	low

PEACHLAND SOILS (PA)

GENERAL COMMENTS

Peachland soils occur in a few scattered areas near Trepanier, Westbank, East Kelowna and north of Ellison. They occupy gentle to very steep slopes in association with Gammil, Hayman and Harrland soils.

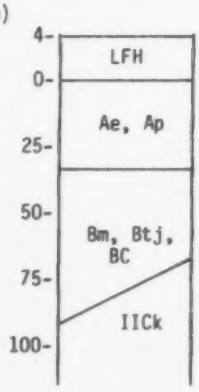
Peachland soils have developed in gravelly and stony, coarse-textured hummocky and pitted fluvioglacial deposits (kame) which are generally underlain by moderately coarse to medium textured glacial till. Surface and subsurface textures are gravelly sandy loam or gravelly loamy sand while subsoils are usually gravelly loam or gravelly silt loam. These Eluviated Eutric Brunisol soils are well to rapidly drained, rapidly pervious and have low water holding capacity.

Peachland soils are moderately to poorly suited for agricultural use. Stoniness, low water holding capacity and other adverse topography are severe limitations. Cultivated and irrigated areas on gentle and moderate slopes are currently planted to tree fruits and vineyards. The natural vegetation is dominantly Ponderosa pine and Douglas-fir with grasses in the understory.

Peachland soils occur on moderate slopes near Trepanier.

The soils are moderately well suited for urban and related uses although adverse topography in some areas may be restricting its use.

GENERALIZED PEACHLAND SOIL PROFILE



Raw to well decomposed needles, leaves and other forest litter.

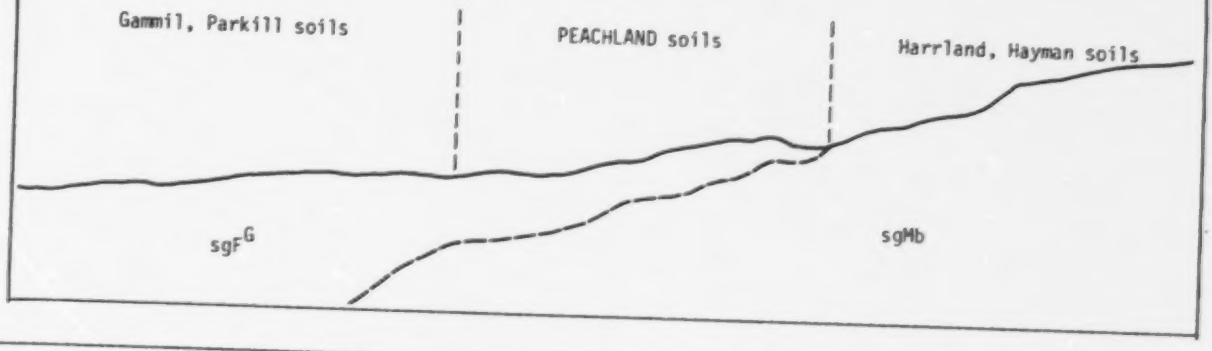
Light brownish gray (2.5Y 6/2), gravelly loamy sand loam; weak, medium platy breaking to moderate, coarse subangular blocky peds; slightly hard consistence.

Light brownish gray or light yellowish brown (2.5Y 6.3), gravelly sandy loam or gravelly loam; moderate, medium, subangular blocky structure; slightly hard consistence.

Grayish-brown (2.5Y 5/2), gravelly silt loam; massive, breaking to moderate, fine angular blocky peds; friable to firm consistence; moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

PEACHLAND SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >5
PARENT MATERIAL	: fluvioglacial deposits over glacial till
DEPTH TO FREE LIME (cm)	: >80
SURFACE STONINESS CLASS	: 1-4
DEPTH TO WATERTABLE (m)	: >5
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: gentle to very steep slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	GP, GM, GW	GM, GP	GC, GM
AASHO TEXTURE SYMBOL	A-1	A-1; A-2-4	A-2-4
LIQUID LIMIT	NP	NP	5-15
PLASTICITY INDEX	NP	NP	0-5 or NP
SHEAR STRENGTH	high	high	medium to high
SOIL TEXTURE	gravelly loamy sand, gravelly sandy loam	gravelly sandy loam, gravelly loam	gravelly silt loam
PERMEABILITY	rapid	rapid to moderate	moderate
AWSC	low	low	moderate to high
COARSE >7.5 cm (%)	10-25	5-20	5-15
FRAGMENTS <7.5 cm (%)	20-30	15-25	10-20
PASSING # 4	5-15	10-25	30-65
SIEVES (%) # 40	4-10	5-15	10-25
#200	<5	2-10	5-20

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.0-6.8	6.5-7.5	7.6-7.8
1:2 0.01M $CaCl_2$	5.6-6.3	6.2-7.0	7.2-7.5
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	low to very low	very low	very low
EXCHANGE CAPACITY	low	low	low to very low
EXCHANGEABLE CATIONS - Ca	medium to high	high	high
- Mg	high	high	high
- Na	low	low	low to medium
- K	high	medium	low to medium
BASE SATURATION (%)	60-85	90-100	100
PHOSPHOROUS	medium	moderately high	high
SULFUR	low	low	low

PENTICTON SOILS (P)

GENERAL COMMENTS

Penticton soils are common along either side of Okanagan and Skaha lakes. They occur on very gentle to strong slopes, usually in association with Munson, Olhausen and Chapman soils.

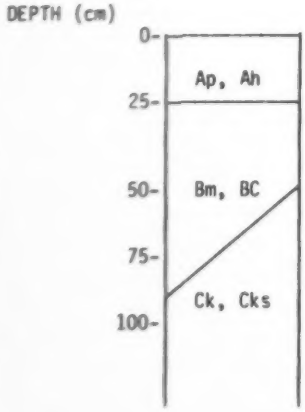
Penticton soils developed in stone-free, silty, stratified glaciolacustrine sediments. Soil textures range from silt loam in surface and subsurface horizons to silty clay loam in the subsoil. The soils are well to moderately well drained, moderately to slowly pervious and have high water holding capacity and moderate surface runoff. The soils are classified as Orthic Brown.

Penticton soils are well suited for agricultural uses and generally have no limitations for agricultural crops. Most areas are cleared and used for irrigated tree fruits and vineyards. A few small uncleared areas support a natural vegetation of grasses, sagebrush, rabbitbrush and scattered Ponderosa pine.

Gently to moderately sloping areas are typical of Penticton soils.

Penticton soils are moderately to severely limited for urban uses. The silty texture, high shrink-swell potential and low bearing strength in the subsoil are some of the limitations. Subsoil piping is a hazard in some areas. Septic tank effluent disposal may be restricted by slow permeability in the silty clay subsoil.

GENERALIZED PENTICTON SOIL PROFILE



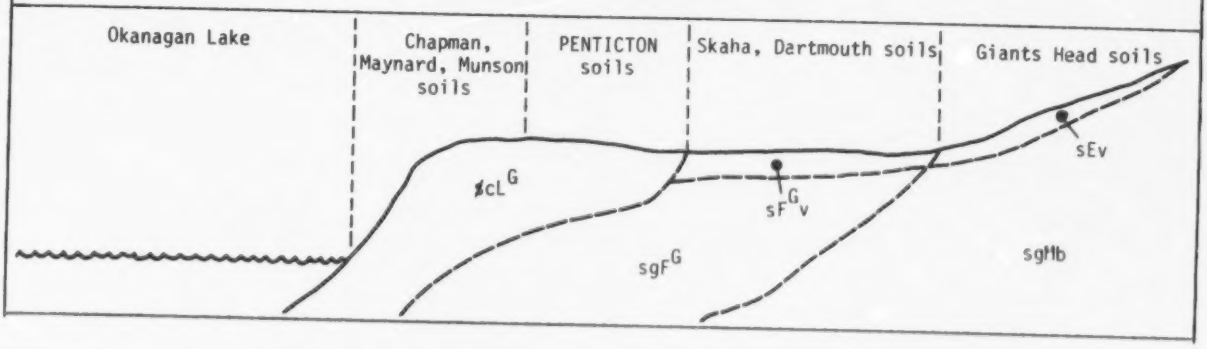
Grayish-brown or brown (10YR 5/2.5), silt loam; weak to moderate, coarse granular structure; friable to soft consistence.

Brown or pale brown (10YR 5.5/3), silt loam; medium to coarse subangular blocky structure; friable to soft consistence; non or weakly calcareous.

Light gray (2.5Y 7/2), silt loam containing thin bands of silty clay loam and fine sandy loam; weak to moderate pseudo-platy structure breaking to moderate, fine, angular blocky peds; slightly hard consistence; moderately to strongly calcareous; weakly or moderately saline.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

PENTICTON SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	>2
PARENT MATERIAL	glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	70
SURFACE STONINESS CLASS	0
DEPTH TO WATERTABLE (m)	>2
PERVIOUSNESS CLASS	moderate to slow
SOIL DRAINAGE CLASS	well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	80; compact subsoil
TOPOGRAPHY	very gentle to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	CL-ML	CL-ML	ML (CL)
AASHO TEXTURE SYMBOL	A-6; A-7	A-6; A-7	A-4; (A-6)
LIQUID LIMIT	30-50	30-50	30-50
PLASTICITY INDEX	11-25	11-25	10-25
SHEAR STRENGTH	medium to low	medium to low	medium to low
SOIL TEXTURE	silt loam	silt loam with banded silty clay loam and fine sandy loam	silt loam, silty clay loam or fine sandy loam
PERMEABILITY	moderate	moderate	slow
AWSC	high	high	high
COARSE >7.5 cm (%)	0	0	0
FRAGMENTS <7.5 cm (%)	0	0	0
PASSING # 4	100	100	100
SIEVES (%) # 40	100	100	100
#200	98-100	95-100	90-100

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.1-7.9	7.8-8.5	8.4-8.6
1:2 0.01M $CaCl_2$	6.8-7.5	7.5-8.2	8.0-8.4
SALINITY CLASS	non-saline	very weakly to weakly saline	weakly or moderately saline
ORGANIC CARBON	moderate	low	very low
NITROGEN	low	very low	very low
EXCHANGE CAPACITY	medium	medium	low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	very low	low	low
- K	high	high	high
BASE SATURATION (%)	98-100	100	100
PHOSPHOROUS	low	very low	low
SULFUR	low	high	very high

PONDEROSA SOILS (PO)

GENERAL COMMENTS

Ponderosa soils occur only in the vicinity of Oliver. They occupy nearly level to moderately sloping areas in association with Rutland, Glenfir, Ratnip and Burnell Lake soils.

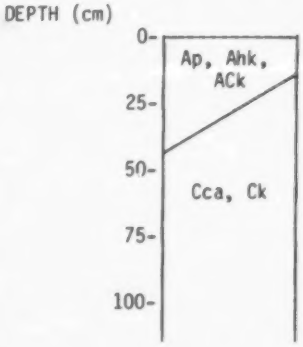
Ponderosa soils have developed in a gravelly, moderately coarse textured fluvial veneer between 10 and 50 cm thick, overlying gravelly coarse textured fluvial fan deposits. Surface and subsurface textures are gravelly or very gravelly sandy loam or gravelly loam; subsoils are very gravelly loamy sand. These Rego Dark Brown: calcareous phase soils are well to rapidly drained, rapidly pervious and have low water holding capacity.

Almost all areas of Ponderosa soils are cleared, cultivated and planted to tree fruits and vineyards. Small, scattered, uncleared areas located on steep slopes support scattered Ponderosa pine, sagebrush and grass in the understory.

Except for a few steeply sloping areas, Ponderosa soils are moderately well suited for most urban and related uses. Incomplete septic tank effluent filtration may occur in the coarse-textured subsoils.

A typical view of moderately sloping Ponderosa soils near Oliver.

GENERALIZED PONDEROSA SOIL PROFILE

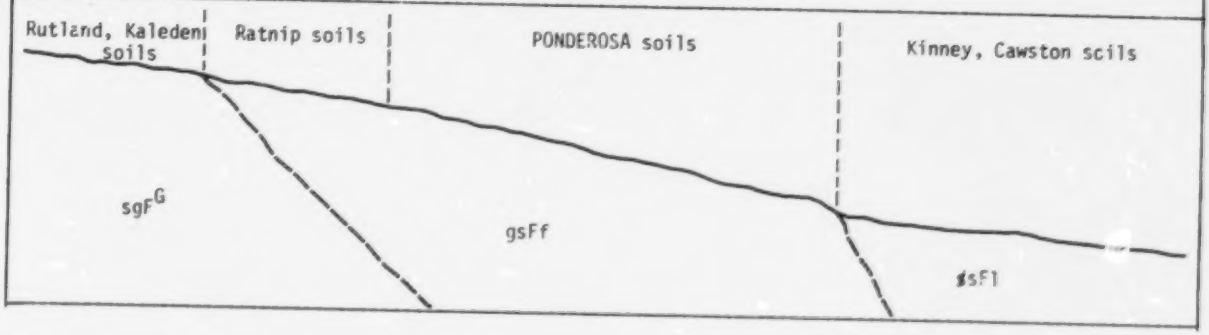


Dark grayish brown (10YR 4.5/2.5), gravelly sandy loam; weak, fine to very fine, granular structure; very friable consistence; moderately calcareous.

Pale brown (10YR 5.5/3 - 6/3.5), very gravelly loamy sand; weak, fine subangular blocky structure; very friable to firm consistence; strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Rego Dark Brown: calcareous phase

PONDEROSA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: calcareous to surface
SURFACE STONINESS CLASS	: 0-3
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	GM-GC	GM-GP
AASHO TEXTURE SYMBOL	A-1	A-1
LIQUID LIMIT	15-25 or NP	NP
PLASTICITY INDEX	0.1-5 or NP	NP
SHEAR STRENGTH	high to medium	high to medium
SOIL TEXTURE	very gravelly sandy loam to gravelly loam	very gravelly loamy sand
PERMEABILITY	rapid	very rapid
AWSC	moderate to low	low
COARSE >7.5 cm (%)	5-15	20-40
FRAGMENTS <7.5 cm (%)	20-75	30-60
PASSING # 4	50-80	30-50
SIEVES (%) # 40	20-30	5-20
#200	5-10	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	7.8-8.1	8.0-8.5
1:2 0.01M $CaCl_2$	7.4-7.6	7.5-7.8
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate	low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	low	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	low	medium to high
- Na	very low	very low
- K	medium	moderately high
BASE SATURATION (%)	100	100
PHOSPHOROUS	very low	very low
SULFUR	low	medium

POSTILL SOILS (PL)

GENERAL COMMENTS

Postill soils occupy numerous hilly areas in the northern portion of the map area. They occur in association with Faulder, Gammil and Harrland soils and bedrock outcrops on moderate to extreme slopes.

The soils have developed in gravelly and sometimes stony, moderately coarse to coarse textured, mixed colluvium and glacial till which is between 10 and 100 cm thick and overlies bedrock.

The soils are well to rapidly drained, have moderate to rapid permeability and slow to moderate surface runoff. Soil classification is Eluviated Eutric Brunisol, lithic phase.

Stoniness, shallowness to bedrock and steep slopes are the main limits for land use and preclude arable agriculture, however, some limited natural grazing is possible. The natural vegetation mostly consists of Ponderosa pine, Douglas-fir with various grasses and shrubs in the understory.

Postill soils occupy the ridge in the middle distance in association with Harrland soils and bedrock outcrops.

Restrictions for urban uses include steep slopes, shallowness to bedrock and in some areas insufficient soil depth for septic tank placement.

GENERALIZED POSTILL SOIL PROFILE

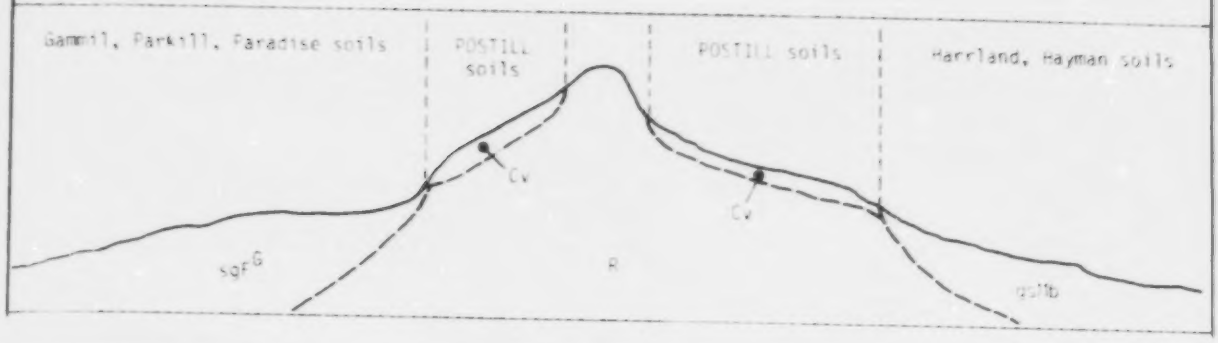
Ae, Ahe — Light gray (10YR 6.5/1.5), sandy loam or gravelly sandy loam, weak, subangular blocky structure, very friable to friable consistence.

Bm, Bf — Pale brown (10YR 6/3), gravelly loam, sand or gravelly sandy loam; weak, medium, subangular blocky structure, friable consistence.

BC — Light yellowish brown (10YR 6.5/2.5), gravelly loam, sand, sandy loam or gravelly sandy loam; massive, friable to firm consistence, non or weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol — LITHIC Phase

POSTILL SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: varies between 0.1 and 1
PARENT MATERIAL	: mixed colluvial and glacial till veneer over bedrock
DEPTH TO FREE LIME (cm)	: >80 or absent
SURFACE STONINESS CLASS	: 0-3
DEPTH TO WATERTABLE (m)	: >5
PERVIOUSNESS CLASS	: rapid to moderate
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: >100, bedrock
TOPOGRAPHY	: moderate to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM-SM	SM-GM	
AASHO TEXTURE SYMBOL	A-2-4, A-4	A-1, A-2-4	
LIQUID LIMIT	NP	NP	
PLASTICITY INDEX	NP	NP	
SHEAR STRENGTH	high to medium	high to medium	
SOIL TEXTURE	sandy loam or gravelly sandy loam	sandy loam, gravelly loamy sand	
PERMEABILITY	rapid	rapid	BEDROCK
AKSO	low to moderate	low	
COARSE >7.5 cm (%)	0-15	0-15	
FRAGMENTS >7.5 cm (%)	10-55	10-55	
PASSING # 4	60-90	40-80	
SIEVES (%) # 40	40-80	30-50	
#200	20-50	10-20	

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.1-7.1	7.0-8.0	
1:2 0.01M $CaCl_2$	5.6-6.7	6.5-7.6	
SALINITY CLASS	non-saline	non-saline	
ORGANIC CARBON	low to moderate	very low	
NITROGEN	low to very low	very low	
EXCHANGE CAPACITY	low	very low	
EXCHANGEABLE CATIONS - Ca	medium	high	BEDROCK
- Mg	medium	high	
- Na	low	low	
- K	low	low	
BASE SATURATION (%)	50-90	95-200	
PHOSPHOROUS	low	low	
SULFUR	low	low	

PRIEST CREEK SOILS (PT)

GENERAL COMMENTS

Priest Creek soils only occur near Kelowna in association with Guisachan, Summerland and Pandozy soils. These nearly level to very gently undulating soils are usually imperfectly drained; however, some slightly higher moderately well drained knolls and ridges not under the direct influence of groundwater are also included. Depressional sites are subject to inundation.

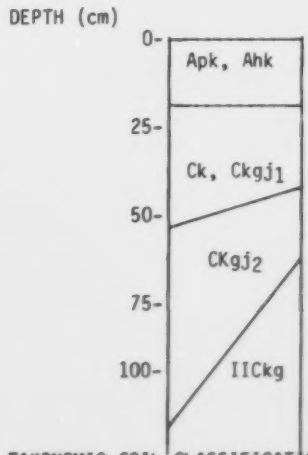
Priest Creek soils have developed in calcareous, medium-textured lower fluvial fan and floodplain deposits. Surface and subsurface textures are silt loam or loam; these grade to gravelly sandy loam or gravelly silt loam in the subsoil. These Gleyed Humic Regosol: calcareous phase soils are moderately pervious and have moderate to high water storage capacity.

The soils are fertile and in cleared areas are used for pasture, hay production or vegetable crops. Their main restrictions are fluctuating water tables and frequent flooding potential. Natural vegetation consists of black cottonwood, aspen, birch with grass in the understory.

Priest Creek soils occupies the low lying, treed area in the left side of the photo.

Variable bearing strengths, flooding potential and fluctuating water tables somewhat limit Priest Creek soils for urban and related uses.

GENERALIZED PRIEST CREEK SOIL PROFILE



Grayish-brown (10YR 5/2), silt loam or loam; moderate, medium, platy breaking into weak to moderate, fine subangular blocky structure; very friable consistence; moderately calcareous.

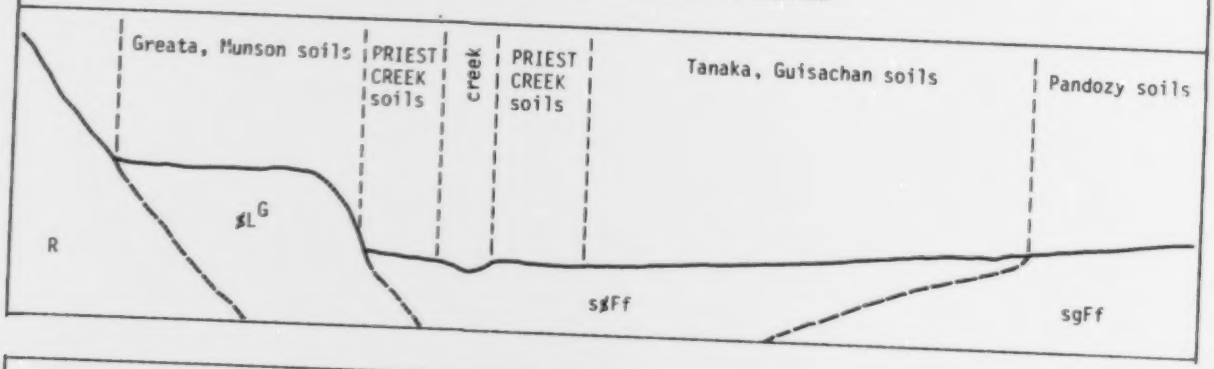
Very pale brown to pale brown (10YR 6.5/3.5), loam or sandy loam; weak, coarse prismatic structure breaking to weak to moderate, medium subangular blocky peds; friable consistence; moderately to strongly calcareous; few, fine, distinct mottles in the lower part.

Light gray (10YR 7/1) sandy loam to silt loam; massive breaking to medium, fine to moderate, angular blocky peds; very firm consistence; strongly calcareous; common, fine distinct, yellowish-brown (10YR 5/6.5) mottles.

Gray (5Y 5.5/1), gravelly sandy loam to gravelly silt loam; massive breaking to moderate, fine to medium angular blocky peds; very firm consistence; strongly calcareous; many, medium, distinct yellowish-brown (10YR 5/6) mottles.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Humic Regosol: calcareous phase

PRIEST CREEK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: calcareous to surface
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuates between 50 cm and 1.5 m
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: dominantly imperfect, ranging to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 75; water table
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	ML	ML-CL
AASHO TEXTURE SYMBOL	A-3, A-4	A-4
LIQUID LIMIT	15-25 or NP	NP
PLASTICITY INDEX	0.1-5 or NP	NP
SHEAR STRENGTH	medium to low	medium to low
SOIL TEXTURE	silt loam, loam	gravelly sandy loam, gravelly silt loam
PERMEABILITY	moderate	moderate
AWSC	moderate to high	moderate
COARSE >7.5 cm (%)	0	0-5
FRAGMENTS <7.5 cm (%)	0	15-30
PASSING # 4	100	60-80
SIEVES (%) # 40	60-90	10-40
#200	30-70	15-30

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	8.5-9.0	8.6-8.9
1:2 0.01M $CaCl_2$	7.9-8.3	7.9-8.3
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	medium	low to medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	very high	very high
- Na	medium	medium
- K	high	high
BASE SATURATION (%)	100	100
PHOSPHOROUS	low	very low
SULFUR	low to medium	low

RATNIP SOILS (RN)

GENERAL COMMENTS

Ratnip soils occur near Oliver, Summerland and East Kelowna. They occupy nearly level to strong slopes and are usually associated with Stemwinder, Glenfir, Rutland and Inkaneep soils.

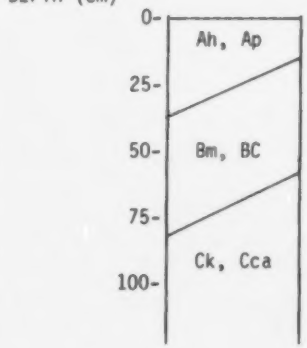
The parent material of Ratnip soils consists of gravelly, coarse textured fluvial fan deposits. Surface and subsurface textures range from gravelly sandy loam to gravelly loamy sand; subsoils vary from gravelly loamy sand to gravelly sand. Surface stones vary from few on the fan apron to many at the fan apex. These Orthic Dark Brown soils are well to rapidly drained, moderately to rapidly pervious and have low to moderate water holding capacity.

Ratnip soils are suited for many agricultural crops although adverse topography and stoniness are limiting in some areas. Cleared and cultivated areas are mostly planted to orchards and vineyards. The native vegetation consists of grasses with scattered Ponderosa pine and Douglas-fir.

A moderately sloping area of Ratnip soils in the middle distance.

Ratnip soils are well suited for most urban and related uses; however, in some areas excessive stoniness may hinder excavation. Incomplete filtration of septic tank effluent by the coarse-textures is probable.

GENERALIZED RATNIP SOIL PROFILE



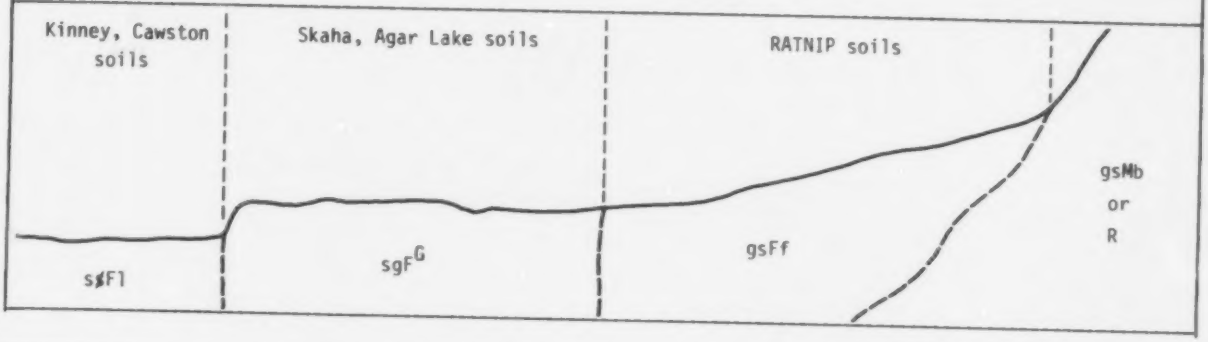
Ah, Ap: Brown or dark brown (10YR 4/3), gravelly sandy loam; weak, very fine to fine, granular structure; soft to very friable consistence.

Bm, BC: Brown or yellowish-brown (10YR 4/3 - 4.5/3.5), gravelly sandy loam; weak, fine granular structure; very friable consistence; lower part may be weakly calcareous.

Ck, Cca: Pale brown or yellowish-brown (10YR 5.5/3.5), very gravelly loamy sand or very gravelly sand; single-grain; moderately calcareous; generally loose consistence with some firm pockets due to lime cementation.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

RATNIP SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: 70
SURFACE STONINESS CLASS	: 1 (near fan apron) to 4 or 5 (at fan apex)
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate to rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	GM-GC	GM, GW	GW-GP
AASHO TEXTURE SYMBOL	A-1	A-1	A-1
LIQUID LIMIT	10-20	10-20	10-20
PLASTICITY INDEX	0.1-5 or NP	0.1-5 or NP	0.1-5 or NP
SHEAR STRENGTH	high to medium	high to medium	high
SOIL TEXTURE	gravelly sandy loam, gravelly loamy sand	gravelly loamy sand, very gravelly loamy sand	very gravelly loamy sand
PERMEABILITY	moderate	moderate to rapid	rapid
AWSC	moderate	moderate to low	very low
COARSE >7.5 cm (%)	5-10	10-20	10-25
FRAGMENTS <7.5 cm (%)	20-50	20-50	40-70
PASSING # 4	50-80	30-60	10-20
SIEVES (%) # 40	30-60	20-50	2-10
#200	20-50	2-15	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	6.0-7.4	7.6-8.2	7.8-8.6
1:2 0.01M $CaCl_2$	5.3-7.0	7.0-7.2	7.3-8.2
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	low	low to very low	very low
NITROGEN	low to very low	low	very low
EXCHANGE CAPACITY	medium	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	medium	medium	medium
- Na	very low	very low	very low
- K	very high	high	high
BASE SATURATION (%)	80-100	96-100	100
PHOSPHOROUS	medium	medium	low
SULFUR	medium	medium	low

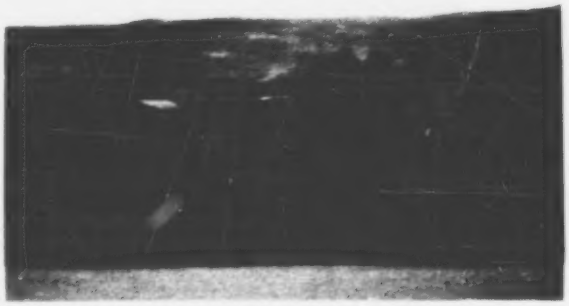
ROY CREEK SOILS (RY)

GENERAL COMMENTS

Roy Creek soils occur in scattered areas throughout the Okanagan Valley portion of the map area. They often occur in close association with Inkaneep, Tomlin and Manery soils on nearly level to moderate slopes.

Roy Creek soils have developed on the aprons of fluvial fans in moderately coarse to medium-textured veneers between 10 and 50 cm thick overlying gravelly coarse-textured fluvial fan deposits. Surface and subsurface textures are sandy loam or loam; subsoil textures are gravelly loamy sand or gravelly sand. Soil drainage is generally imperfect, although the upper parts of some of the undulations may be moderately well drained. These Gleyed Regosol soils are rapidly to moderately pervious and have low to moderate water holding capacity.

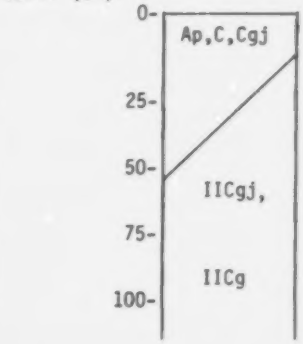
Roy Creek soils are moderately suited for agricultural cropping and are presently used mostly for forage production. Fluctuating water tables inhibit crops that are sensitive to moist and wet subsoils. Uncleared areas support willow, birch, scattered Ponderosa pine and grass.



Roy Creek soils occupy the foreground and central part of the photo.

High water tables in late spring together with coarse subsoil textures are the main restrictions for urban and related development. During freshet seasons septic tank effluent disposal systems may be impaired by higher water tables.

GENERALIZED ROY CREEK SOIL PROFILE

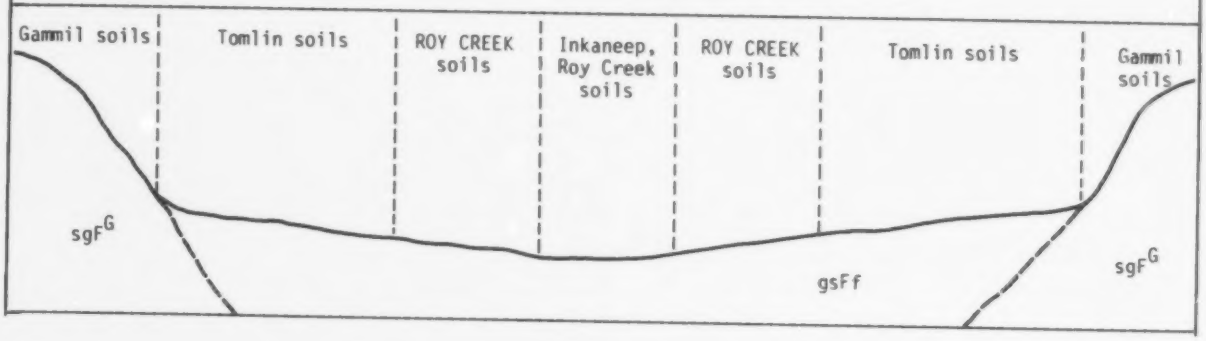


Grayish brown (2.5Y 5.5/2), sandy loam or loam; weak, coarse, platy breaking to weak, fine subangular blocky structure; very friable to firm consistence; few or common, medium, prominent light yellowish brown (2.5Y 6/4) mottles in the lower part.

Light brownish gray to light yellowish brown (2.5Y 6/3), gravelly loamy sand; massive breaking to moderate, fine angular blocky peds; very friable or slightly hard consistence; many, coarse, prominent, yellowish-brown (10YR 5/6) mottles.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

ROY CREEK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0-1
DEPTH TO WATERTABLE (m)	: fluctuates between 50 cm and >1.5 m
PERVIOUSNESS CLASS	: rapid to moderate
SOIL DRAINAGE CLASS	: dominantly imperfect; ranging to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 100; water table
TOPOGRAPHY	: nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM	GP-SM
AASHO TEXTURE SYMBOL	A-1; A-2-4	A-1, A-2-4
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loam	gravelly loamy sand, gravelly sand
PERMEABILITY	moderate to rapid	very rapid
AWSC	moderate to low	very low
COARSE >7.5 cm (%)	0	2-15
FRAGMENTS <7.5 cm (%)	0-5	15-40
PASSING # 4	90-100	30-60
SIEVES (%) # 40	50-75	5-15
#200	20-40	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	6.4-6.9	6.6-6.9
1:2 0.01M $CaCl_2$	6.0-6.6	5.9-6.6
SALINITY CLASS	non-saline	non to very weakly saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low to moderate	very low
EXCHANGEABLE CATIONS - Ca	medium	low to medium
- Mg	medium	medium
- Na	very low	very low
- K	low to moderate	low
BASE SATURATION (%)	60-100	80-100
PHOSPHOROUS	medium to moderately high	low to medium
SULFUR	low to medium	low to medium

RUMOHR SOILS (RH)

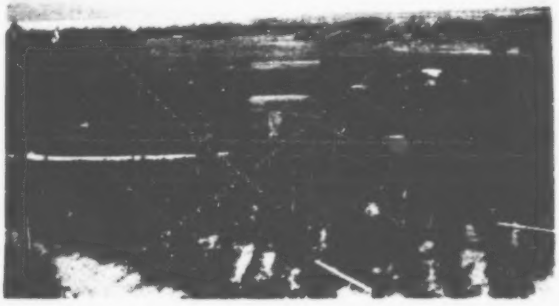
GENERAL COMMENTS

Rumohr soils occur only near the Kelowna Airport and in the Okanagan Mission area. They occupy nearly level to depressional slopes and are associated with Kendall, Inkaneep and Tanaka soils.

Rumohr soils developed in mesic organic material usually between 20 and 60 cm thick and underlain by up to 50 cm of marl. The subsoil consists of sandy fluvial deposits. The soil is generally classified as Rego Gleysol: peaty and calcareous phase. It is very poorly drained and has a high fluctuating groundwater table.

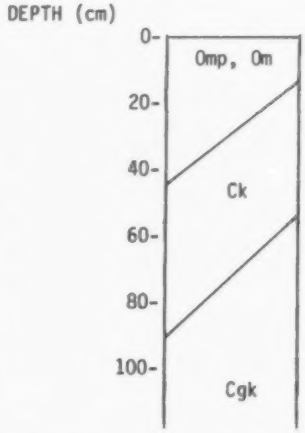
Cultivated and drained areas are used for either vegetable or hay production. Natural vegetation in undrained areas consists of sedges, reeds and grasses, scattered willows and black cottonwoods.

Rumohr soils are unsuited for urban and related uses. Low bearing strengths, high water tables and flooding potential are all severe limitations.



Rumohr soils occupy the lighter toned area in the middle distance visible through the opening in the trees.

GENERALIZED RUMOHR SOIL PROFILE



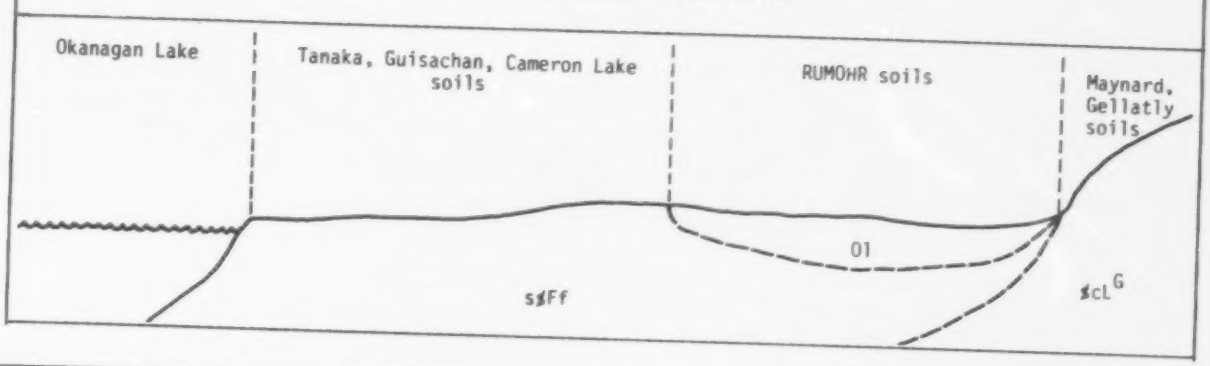
Black to very dusky red (2.5YR 2/1), moderately decomposed (mesic) organic material; moderate, very fine subangular blocky structure; very friable consistence; weakly calcareous.

Light gray (5Y 7/1), marl; silt loam; moderate to strong, fine granular structure; friable consistence; very strongly calcareous.

Dark greenish gray (5GY 4/1), fine sandy loam or loamy fine sand; structureless; massive; non to slightly sticky consistence; strongly calcareous and gleyed.

TAXONOMIC SOIL CLASSIFICATION: Rego Gleysol: peaty and calcareous phase

RUMOHR SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >5 m
PARENT MATERIAL	: organic deposits and marl over fluvial deposits
DEPTH TO FREE LIME (cm)	: calcareous to surface
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuates between 0 and 1 m
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: very poor
DEPTH TO ROOT RESTRICTION (cm)	: 50; groundwater table
TOPOGRAPHY	: nearly level to slightly depressional

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	Pt	ML-CL	SM-SP
AWSC	very high	high	low to medium
TYPE OF ORGANIC MATERIAL	mesic	marl	-
RUBBED FIBRE CONTENT	15-20	-	-
von POST SCALE	5	-	-
PYROPHOSPHATE	4	-	-
SOIL TEXTURE	-	-	fine loamy sand to fine to sandy loam
COARSE FRAGMENTS >7.5 cm (%)	0	0	0
<7.5 cm (%)	0	0	0
PASSING # 4	-	-	100
SIEVES (%) # 40	-	-	50-75
#200	-	-	2-6

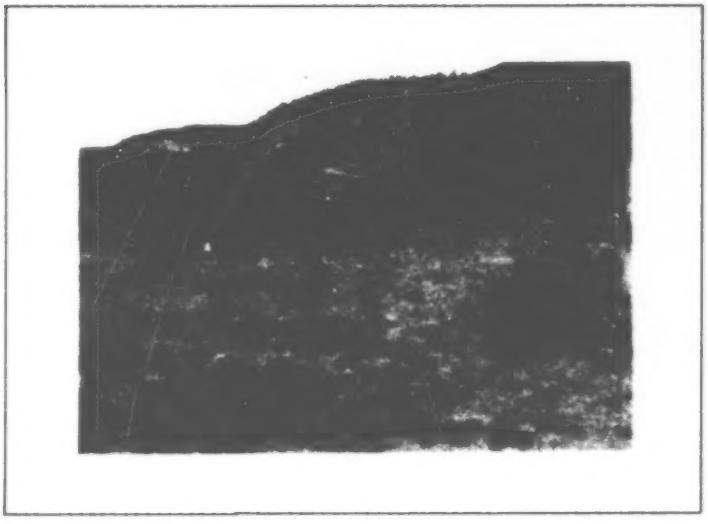
CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	7.5-7.8	7.8-8.0	7.8-8.0
1:2 0.01M $CaCl_2$	7.0-7.3	7.2-7.5	7.2-7.5
SALINITY CLASS	weakly saline	very weakly saline	non-saline
ORGANIC CARBON	very high	low	very low
NITROGEN	high	very low	very low
EXCHANGE CAPACITY	very high	-	-
EXCHANGEABLE CATIONS - Ca	high	-	-
- Mg	high	-	-
- Na	very high	-	-
- K	moderate	-	-
BASE SATURATION (%)	100	100	100
PHOSPHOROUS	very low	very low	very low
SULFUR	very high	high	very high

RUTLAND SOILS (R)

GENERAL COMMENTS

Rutland soils occupy significant areas throughout the Okanagan Valley portion of the map area and also near Keremeos in the Similkameen Valley. Topography is usually level to gently sloping although some terrace scarps are extremely sloping. Soils commonly associated with Rutland soils include Faulder, Dartmouth, Keremos, Oyama and Skaha.

The parent material of Rutland soils is a moderately coarse textured veneer between 10 and 25 cm thick which overlies gravelly and stony, very coarse textured glaciofluvial deposits. Surface soil textures are dominantly sandy loam or loamy sand while subsurface and subsoil textures are gravelly sand or gravelly loamy sand. Stones and cobbles are also common. Rutland soils are classifed as Orthic Dark Brown. They are rapidly drained, rapidly pervious, have slow surface runoff and low water holding capacity.

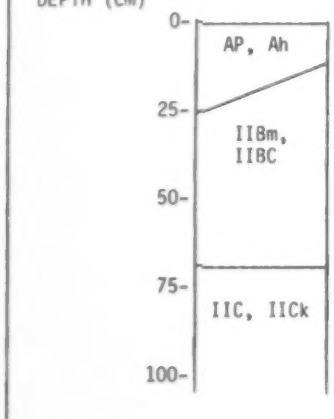


A very gently sloping area of undeveloped Rutland soils northeast of Oliver.

The main agricultural limitations are gravelly and stony textures, rapid permeability and low water holding capacity. Tree fruits and grapes are presently grown in most cultivated and irrigated areas. Typical native vegetation consists of a variety of grasses, sagebrush, rabbitbrush and scattered Ponderosa pine.

Rutland soils are well suited for urban and related uses. They are rapidly drained, have high bearing capacity and generally level topography. The depth of topsoil is shallow. Effluent from septic field installations may be incompletely filtered by the very gravelly, coarse-textured subsoil.

GENERALIZED RUTLAND SOIL PROFILE



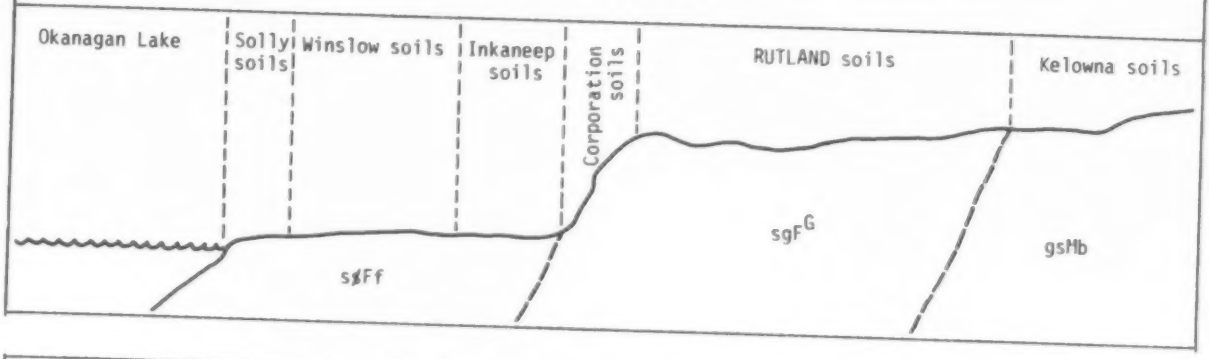
AP, Ah — Dark grayish brown or brown (10YR 4/2.5), sandy loam or loamy sand; weak, fine subangular blocky structure; soft consistence.

IIBm, IIBC — Brown (10YR 5/3), very gravelly sand or very gravelly loamy sand; weak, very fine subangular blocky structure; soft consistence.

IIC, IICk — Light gray to brownish-yellow (10YR 7/1-6/6), very gravelly sand; single-grain; loose consistence; weakly calcareous in upper part, grading to moderately calcareous at depth.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Brown

RUTLAND SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >80
SURFACE STONINESS CLASS	: 1-4
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none, other than that due to gravelly and strong subsurface textures
TOPOGRAPHY	: mostly nearly level to gentle slopes; some terrace scarps may be extremely sloping

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
UNIFIED TEXTURE SYMBOL	SM	GW-GP
AASHO TEXTURE SYMBOL	A-2-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	gravelly loamy sand, very gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	low	very low
COARSE >7.5 cm (%)	0-5	10-30
FRAGMENTS <7.5 cm (%)	0-10	30-80
PASSING # 4	60-100	50-80
SIEVES (%) # 40	40-80	1-5
#200	10-40	<4

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-20 cm	>20 cm
SOIL REACTION (pH) 1:1 H_2O	6.6-7.4	7.2-8.0
1:2 0.01M $CaCl_2$	6.1-6.8	6.8-7.5
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate	very low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	very low	medium
- K	high	low
BASE SATURATION (%)	90-100	100
PHOSPHOROUS	medium	variable
SULFUR	low	low

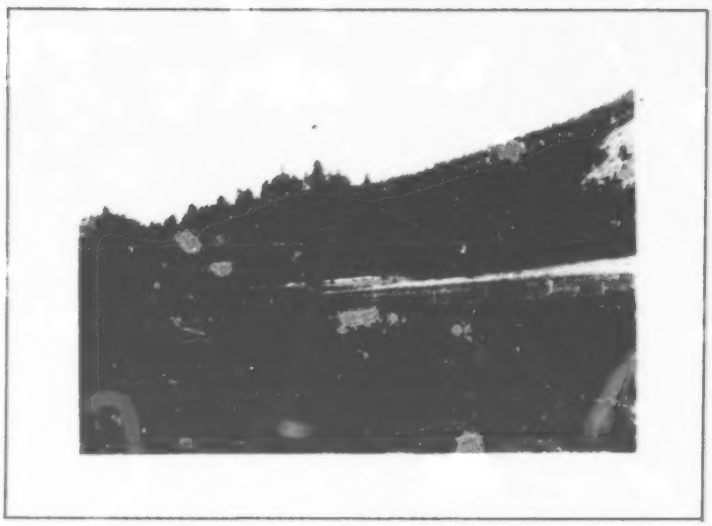
SHANNON SOILS (SA)

GENERAL COMMENTS

Shannon soils occur in a few, small, nearly level to gently sloping areas near Westbank in association with Tomlin, Winslow, Paradise and Gammil soils.

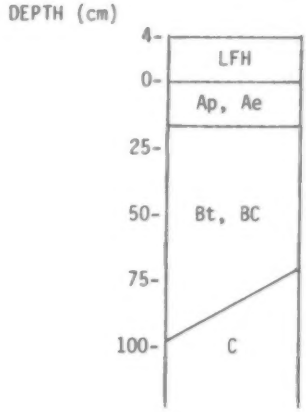
Shannon soils have developed in gravelly, medium-textured fluvial fan deposits that grade to moderately coarse textured materials below about 60 cm. Surface textures are generally gravelly loam while subsurface textures are gravelly sandy clay loam or gravelly loam. The subsoil is generally gravelly sandy loam. These Orthic Gray Luvisol soils are well drained, moderately pervious, and have moderate to high water holding capacity.

Shannon soils are moderately well suited for most agricultural uses; gravelly textures are restrictive for crop production in some areas. Uncleared areas support Ponderosa pine and Douglas-fir with grasses and shrubs in the understory. Most areas are cleared and cultivated and are presently used for alfalfa and hay production. The soils are well suited for urban and related uses as they are well drained and bearing strength is high.



Shannon soils occur on moderate slopes near Westbank.

GENERALIZED SHANNON SOIL PROFILE



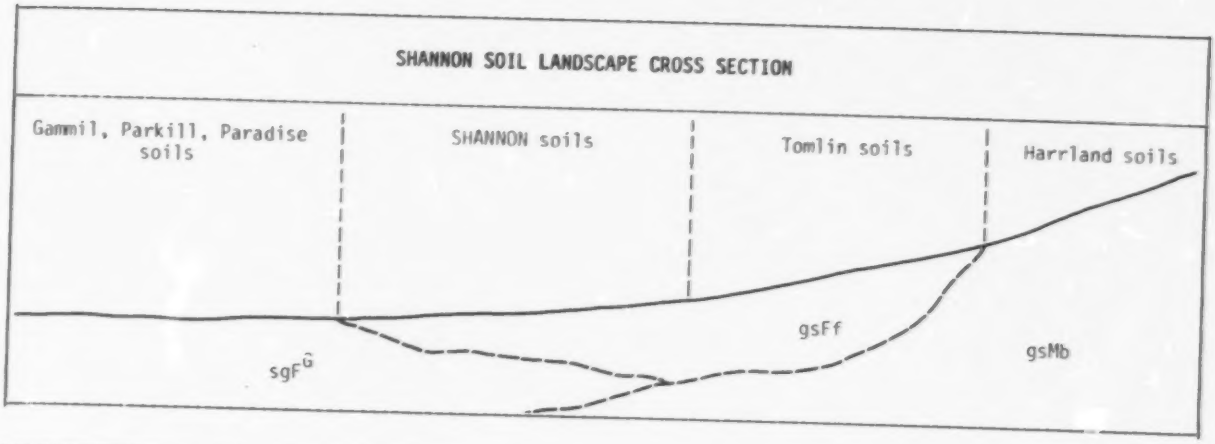
Raw to well decomposed needles, leaves and other forest floor litter.

Grayish-brown (10YR 5/2), gravelly sandy loam or gravelly loam; weak to moderate, very fine subangular blocky structure; slightly hard consistence.

Yellowish-brown to pale brown (10YR 5.5/3.5), gravelly sandy clay loam or gravelly loam; moderate to strong, medium to coarse subangular blocky structure; hard consistence.

Yellowish-brown (10YR 5/3), very gravelly sandy loam; massive breaking into weak, fine angular blocky peds; very friable consistence; non to weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Gray Luvisol



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: >120
SURFACE STONINESS CLASS	: 0-2
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: somewhat restricted at about 40 cm by subsurface clay accumulation
TOPOGRAPHY	: nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SC-GM	GC-SC	GC-GM
AASHO TEXTURE SYMBOL	A-2-6	A-2-6	A-1
LIQUID LIMIT	20-30	20-30	15-28
PLASTICITY INDEX	5-8	5-8	1-6
SHEAR STRENGTH	medium to low	medium	medium to high
SOIL TEXTURE	gravelly loam, gravelly sandy loam	gravelly loam, gravelly sandy clay loam	gravelly or very gravelly sandy loam
PERMEABILITY	moderate	moderate	moderate to rapid
AWSC	moderate	moderate	moderate to low
COARSE FRAGMENTS >7.5 cm (%)	0-5	0-5	0-5
COARSE FRAGMENTS <7.5 cm (%)	20-50	30-60	30-60
PASSING # 4	80-100	80-100	20-35
SIEVES (%) # 40	50-90	20-50	5-15
SIEVES (%) #200	20-50	5-20	<10

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	6.4-7.0	6.8-7.2	6.8-7.2
SOIL REACTION (pH) 1:2 0.01M $CaCl_2$	5.8-6.5	6.2-6.8	6.2-6.8
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	moderate to low	low	very low
NITROGEN	low to very low	very low	very low
EXCHANGE CAPACITY	medium to high	high to medium	medium to low
EXCHANGEABLE CATIONS - Ca	high	high	high
EXCHANGEABLE CATIONS - Mg	high	high	high
EXCHANGEABLE CATIONS - Na	very low	very low	very low
EXCHANGEABLE CATIONS - K	very high	high	low to very low
BASE SATURATION (%)	80-95	95-100	100
PHOSPHOROUS	medium	low	low
SULFUR	moderately high	low	low

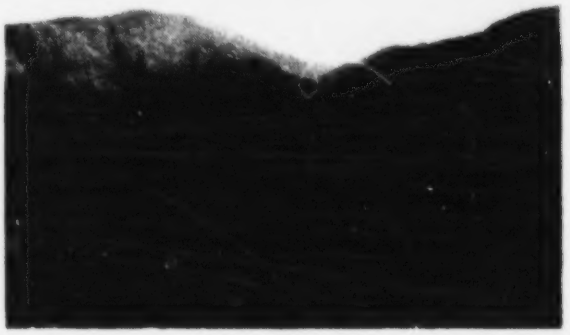
SIMILKAMEEN SOILS (SM)

GENERAL COMMENTS

Similkameen soils occupy areas east of Keremeos and Cawston and in small areas near Oliver, Penticton and Naramata. They occur on nearly level to moderate slopes, usually in association with Skaha, Naramata and Stemwinder soils.

The parent material of these Rego Brown soils consists of a gravel-free, medium-textured fluvial veneer between 30 and 75 cm thick overlying gravelly, moderately coarse textured fluvial fan deposits. Surface and subsurface textures are either silt loam or loam while the subsoils are usually very gravelly sandy loam or gravelly loam. The soils are well drained, have moderate permeability and high water storage capacity.

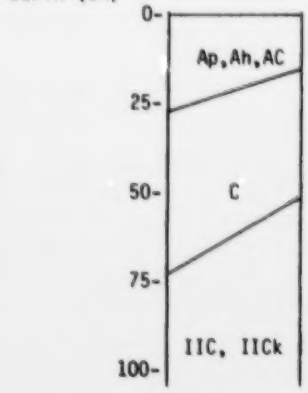
Similkameen soils are well suited for agricultural cropping. Most areas are cleared, cultivated and planted to orchards and vineyards. Uncleared areas support mainly native grasses, sagebrush, rabbitbrush and scattered Ponderosa pine. The soils are among the best agricultural soils in the Similkameen area.



Similkameen soils occupy the gently sloping central portion of the photo.

High bearing strength and good drainage make these soils well suited for urban and related uses as well, although dust from unvegetated areas may be a problem.

GENERALIZED SIMILKAMEEN SOIL PROFILE



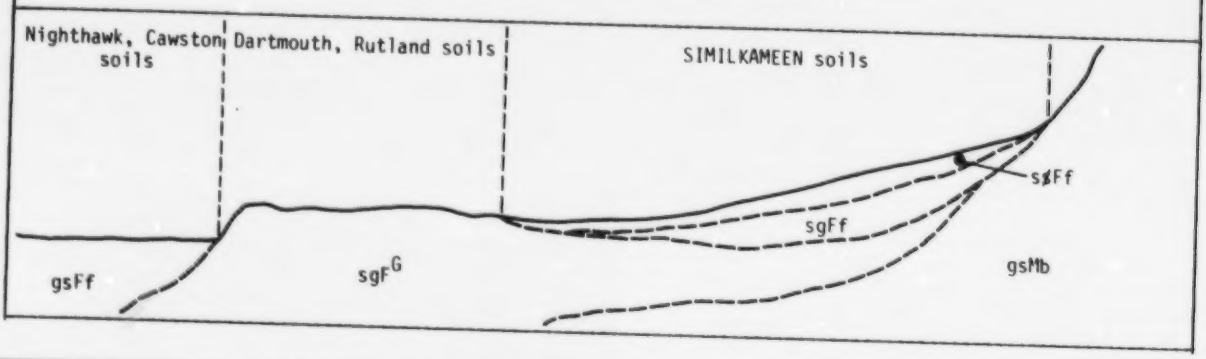
Brown (10YR 5/3), loam or silt loam; weak, fine, subangular blocky structure; very friable consistence.

Light yellowish brown (10YR 5.5/3.5), loam or silt loam ; weak, fine to medium, subangular blocky structure; very friable consistence; non or weakly calcareous.

Light brownish gray or pale brown (10YR 6/2.5), very gravelly sandy loam or gravelly loam; weak to moderate, fine angular blocky structure or single-grain; soft consistence; weakly or moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Rego Brown

SIMILKAMEEN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	>2
PARENT MATERIAL	fluvial fan deposits
DEPTH TO FREE LIME (cm)	>40
SURFACE STONINESS CLASS	0-1
DEPTH TO WATERTABLE (m)	>2
PERVIOUSNESS CLASS	moderate
SOIL DRAINAGE CLASS	well
DEPTH TO ROOT RESTRICTION (cm)	none
TOPOGRAPHY	nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-60 cm	>60 cm
UNIFIED TEXTURE SYMBOL	ML	ML	GW-GM
AASHO TEXTURE SYMBOL	A-4	A-4	A-1
LIQUID LIMIT	10-25 or NP	10-25 or NP	NP
PLASTICITY INDEX	0.1-5 or NP	0.1-5 or NP	NP
SHEAR STRENGTH	medium to low	medium	high to medium
SOIL TEXTURE	silt loam, loam	loam	very gravelly sandy loam
PERMEABILITY	moderate	moderate	rapid to very rapid
AWSC	high	high to moderate	low
COARSE FRAGMENTS >7.5 cm (%)	0	0	10-20
FRAGMENTS <7.5 cm (%)	0-5	0-5	50-90
PASSING # 4	100	100	30-60
SIEVES (%) # 40	70-95	40-60	5-15
#200	60-80	25-60	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-60 cm	>60 cm
SOIL REACTION (pH) 1:1 H_2O	7.2-7.6	7.7-8.4	8.4-8.6
1:2 0.01M $CaCl_2$	6.8-7.2	7.4-8.0	8.1-8.4
SALINITY CLASS	non-saline	non-saline	non to very weakly saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	very low	very low	very low
EXCHANGE CAPACITY	medium	low	very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	low to medium	medium	medium
- K	moderately high	moderately high	moderately high
BASE SATURATION (%)	95-100	100	100
PHOSPHOROUS	medium	medium	medium
SULFUR	low to medium	medium	medium to high

SKAHA SOILS (SK)

GENERAL COMMENTS

Skaha soils are common throughout the southern part of the Okanagan Valley. They occur on nearly level to extreme slopes, usually in association with Debeck, Osoyoos, Haynes and Agar Lake soils.

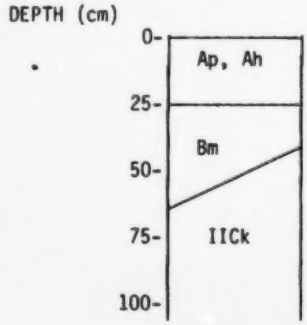
The parent material of Skaha soils is a gravel-free, coarse-textured veneer between 25 and 60 cm thick which overlies gravelly fluvioglacial deposits. Surface and subsurface textures are sandy loam or loamy sand; subsoils are gravelly loamy sand or gravelly sand. These Orthic Brown soils are rapidly drained, rapidly pervious and have moderate to low water holding capacity.

Skaha soils are well suited for most agricultural uses although topography may be limiting in some areas. Most cultivated areas are planted to tree fruits and vineyards; forages and vegetables are also produced in some areas. Uncleared areas support a natural grassland type vegetation consisting of sagebrush, rabbitbrush, grasses and scattered Ponderosa pine.

The foreground and central part of the photo is occupied by Skaha soils.

Good drainage, high bearing strength and generally suitable topography make these soils suited for urban and related uses. Basement excavation may be somewhat difficult due to the coarse gravelly subsoil texture. Incomplete septic effluent filtration in the gravelly subsoil may also occur.

GENERALIZED SKAHA SOIL PROFILE



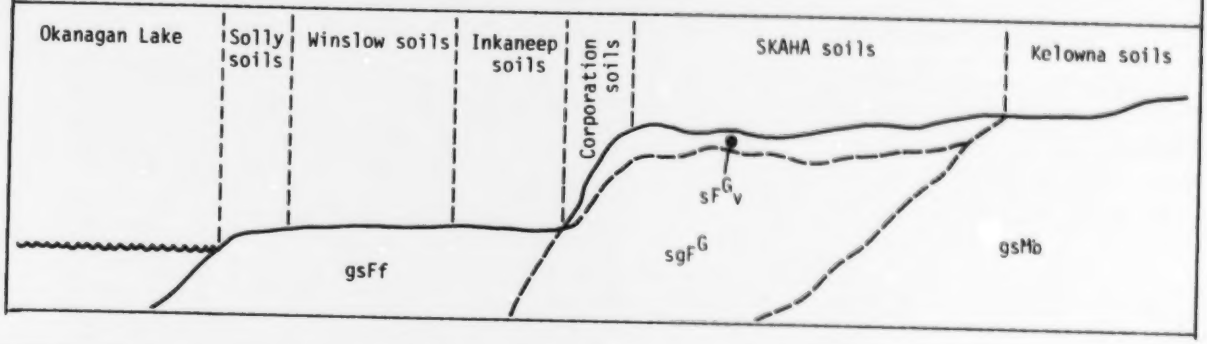
Brown (10YR 5/3), sandy loam or loamy sand; weak, very fine subangular blocky structure; soft consistence.

Brown (10YR 5.5/3), sandy loam; weak, coarse prismatic breaking into weak, medium angular blocky peds; very friable consistence; non to weakly calcareous.

Pale brown (10YR 6.5/3.5), very gravelly loamy sand or very gravelly sand; single-grain; loose consistence; moderately to strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

SKAHA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 60
SURFACE STONINESS CLASS	: 0-1
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM	GW-GP
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly loamy sand, very gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	moderate to low	very low
COARSE >7.5 cm (%)	0	10-60
FRAGMENTS <7.5 cm (%)	0-5	40-80
PASSING # 4	100	15-30
SIEVES (%) # 40	85-100	<5
#200	65-80	<1

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	7.3-8.3	8.5-8.8
1:2 0.01M $CaCl_2$	6.7-7.9	8.2-8.4
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	low	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	low	low
- K	medium	medium
BASE SATURATION (%)	90-100	100
PHOSPHOROUS	low	medium to moderately high
SULFUR	low	high

SNEHUMPTON SOILS (SN)

GENERAL COMMENTS

Snehumpton soils occur in scattered locations on the Similkameen River floodplain near Keremeos and Cawston and on the Okanagan River floodplain near Oliver. They occupy nearly level and very gentle slopes, usually in association with Chopaka, Nighthawk, Coulthard and Susap soils.

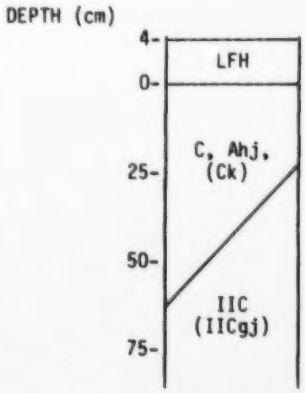
Snehumpton soils have developed in a coarse to moderately coarse-textured fluvial veneer, 25 to 60 cm thick, which overlies very gravelly fluvial deposits. These well to moderately well drained, rapidly pervious Orthic Regosol soils have low to moderate water holding capacity. Very temporary fluctuating water tables may be present in the lower soil during freshet periods and flooding may occur during higher than usual river levels.

Snehumpton soils are good agricultural soils but their irregular and scattered location in the landscape make them difficult to manage separately from adjacent soils. Significant areas are currently utilized either for hay production or pasture. Uncleared areas support black cottonwood, willow, grasses and scattered Ponderosa pine.

Snehumpton soils occupy the partially cleared, central portion of the photo.

Urban uses are limited by potential for flooding and incomplete filtration and purification of septic tank effluent by the coarse subsoil.

GENERALIZED SNEHUMPTON SOIL PROFILE



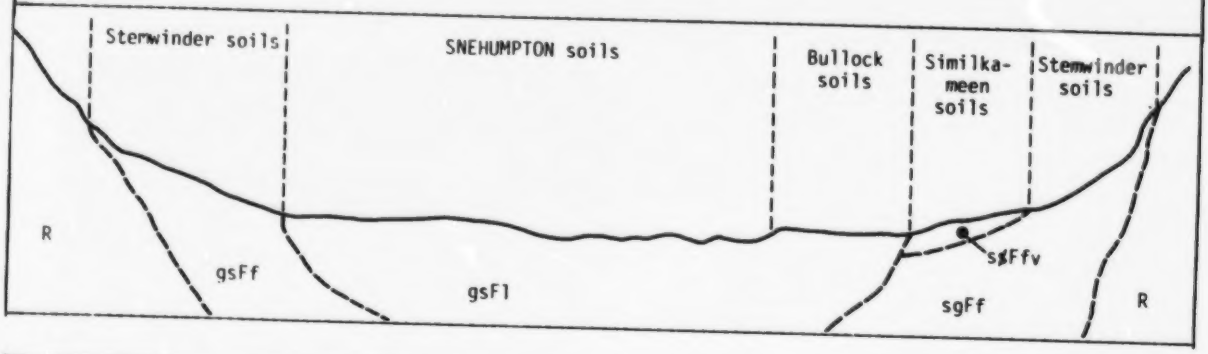
LFH: Raw to well decomposed needles, leaves and other forest litter.

C, Ahj, (Ck): Grayish brown to brown (10YR 5/2.5-6/2), loamy sand or sandy loam; moderate, very fine subangular blocky structure; slightly hard consistence; non to moderately calcareous.

IIC (IICgj): Pale brown to light gray (10YR 6.5/2.5), very gravelly loamy sand or very gravelly sand; single-grain; loose consistence; few, fine, faint light yellowish brown (10YR 6/4) mottles at depth.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol

SNEHUMPTON SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: may be slightly or moderately calcareous in the upper 50 cm; subsoil is usually lime free
SURFACE STONINESS CLASS	: 0-1
DEPTH TO WATERTABLE (m)	: generally >1 m
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to moderately well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	SM-ML	GW-GP
AASHO TEXTURE SYMBOL	A-4; A-3	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	loamy sand, sandy loam	very gravelly loamy sand, very gravelly sand
PERMEABILITY	rapid	very rapid
AWSC	moderate	very low
COARSE >7.5 cm (%)	0	5-15
FRAGMENTS <7.5 cm (%)	0-5	50-90
PASSING # 4	100	10-25
SIEVES (%) # 40	60-80	5-10
#200	<10	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	7.0-7.8	7.8-8.0
1:2 0.01M $CaCl_2$	6.5-7.3	7.0-7.2
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate to low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	low
- Na	low	low
- K	low to medium	low
BASE SATURATION (%)	95-100	100
PHOSPHOROUS	low	low
SULFUR	very high	low

SOLLY SOILS (SO)

GENERAL COMMENTS

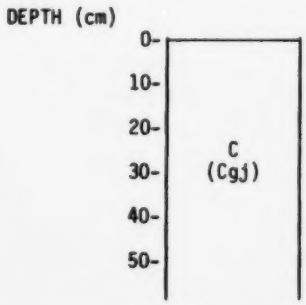
Solly soils occur adjacent to Osoyoos, Vaseaux, Skaha and Okanagan lakes. These Orthic Regosol soils have developed in coarse-textured lacustrine beach deposits. Surface textures are usually loamy sand or sand and grade to sand or gravelly sand at depth. The soils are moderately well to rapidly drained, rapidly pervious and have very low water holding capacity. Temporary water tables may be present in the lower soil depending on lake level and some lower lying areas may flood when lake levels are high.

Solly soils are poorly suited for agricultural uses and only few aras away from the lakes have been developed for pasture.

Substantial areas have been developed for recreational beaches. Urban uses are restricted in some areas by potential for flooding and septic tank effluent is likely to be incompletely filtered by the coarse soil texture and may result in serious groundwater and lake contamination. A fluctuating high water table, low bearing strength and danger of flooding may lead to potential foundation instability.

Solly soils occupy the foreground and central part of the photo.

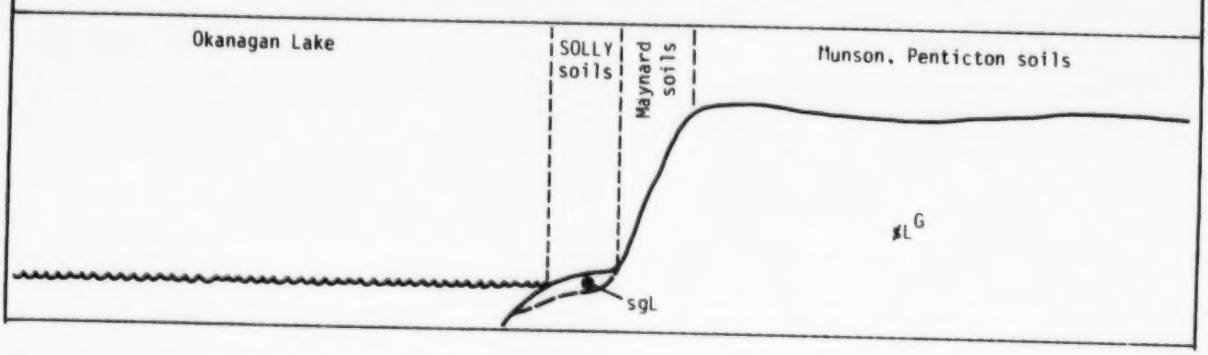
GENERALIZED SOLLY SOIL PROFILE



Pale yellow (2.5Y 7/5), sand, loamy sand or sometimes gravelly sand; single-grain; loose consistence; few, fine, faint mottles at depth.

TAXONOMIC SOIL CLASSIFICATION: Orthic Regosol

SOLLY SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	lacustrine (beach) deposits
DEPTH TO FREE LIME (cm)	:	>100
SURFACE STONINESS CLASS	:	0-2
DEPTH TO WATERTABLE (m)	:	usually >1 m, but fluctuates with lake levels
PERVIOUSNESS CLASS	:	rapidly
SOIL DRAINAGE CLASS	:	rapid to moderately well
DEPTH TO ROOT RESTRICTION (cm)	:	none other than that imposed by fluctuating water table
TOPOGRAPHY	:	nearly level and gentle

PHYSICAL SOIL PROPERTIES	SOIL DEPTH
	0-100 cm
UNIFIED TEXTURE SYMBOL	SM-SW
AASHO TEXTURE SYMBOL	A-1; A-2; A-3; (variable)
LIQUID LIMIT	NP
PLASTICITY INDEX	NP
SHEAR STRENGTH	medium to high
SOIL TEXTURE	loamy sand, sand
PERMEABILITY	rapid to very rapid
AWSC	very low
COARSE >7.5 cm (%)	0
FRAGMENTS <7.5 cm (%)	0-20
PASSING # 4	100
SIEVES (%) # 40	75
#200	2-5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH
	0-100 cm
SOIL REACTION (pH) 1:1 H_2O	5.6-7.3
1:2 0.01M $CaCl_2$	5.2-6.8
SALINITY CLASS	non-saline
ORGANIC CARBON	very low
NITROGEN	very low
EXCHANGE CAPACITY	very low
EXCHANGEABLE CATIONS - Ca	low
- Mg	low
- Na	low
- K	low
BASE SATURATION (%)	60-85
PHOSPHOROUS	very low
SULFUR	low

STEMWINDER SOILS (SW)

GENERAL COMMENTS

Stemwinder soils are common in the Similkameen Valley from the International Boundary to the Ashnola River. They also occur in small areas near Oliver, Penticton and Peachland. The soils occupy nearly level to strong slopes in association with Canyonview, Ratnip, Rutland and Tomlin soils.

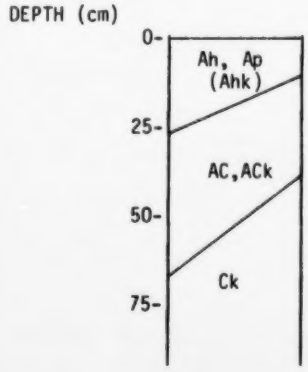
Stemwinder soils have developed in a gravelly, moderately coarse to medium textured veneer between 20 and 50 cm thick which overlies gravelly and stony, coarse-textured fluvial fan deposits. Surface and subsurface textures range from gravelly loam to very gravelly sandy loam. Subsoils are either very gravelly loamy sand or very gravelly sand. Stones and cobbles are common to numerous. These Rego Dark Brown soils are well to rapidly drained, moderately to rapidly pervious, and have moderate to low water holding capacity.

The moderately sloping fluvial fan in the middle distance is typical of where Stemwinder soils occur.

Stemwinder soils are moderately suited for climatically adapted crops such as tree fruits and grapes; however, in some areas excessive stoniness and adverse topography are major limitations. A large portion of topographically suited Stemwinder soils is cleared and planted to orchards and vineyards while other areas that are too stony and bouldery, are utilized for grazing. Uncleared areas support the natural vegetation of various grasses and scattered Ponderosa pine.

Urban uses are generally moderately to well suited for Stemwinder soils. Stony and bouldery subsoils in some areas may make excavation difficult and incomplete septic field effluent filtration in the coarse-textured subsoil is likely to cause contamination in nearby water courses.

GENERALIZED STEMWINDER SOIL PROFILE



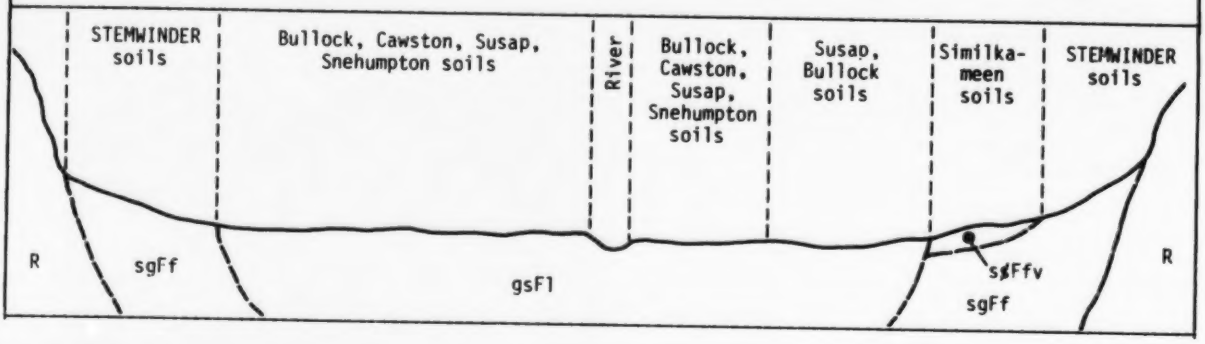
Dark grayish brown (10YR 4/2), gravelly loam to very gravelly sandy loam; weak, fine, subangular blocky structure; very friable consistence; non to weakly calcareous in upper part, moderately calcareous in lower part.

Brown (10YR 4.5/2.5 to 10YR 5/3), cobbly and stony, very gravelly sandy loam; weak, fine, subangular blocky structure; very friable consistence; moderately calcareous.

Grayish-brown (10YR 5.5/2), cobbly and stony, very gravelly loamy sand or very gravelly sand; single-grain; loose consistence; weakly to strongly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Rego Dark Brown

STEMWINDER SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: 20
SURFACE STONINESS CLASS	: 0-3 at fan apron to 3-5 at fan apex
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid to moderate
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
UNIFIED TEXTURE SYMBOL	GM-GC	GW-GM
AASHO TEXTURE SYMBOL	A-1	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	high	high
SOIL TEXTURE	gravelly loam to very gravelly sandy loam	very gravelly loamy sand, very gravelly sand
PERMEABILITY	moderate to rapid	very rapid
AWSC	moderate to low	very low
COARSE >7.5 cm (%)	10-30 (angular)	20-40 (angular)
FRAGMENTS <7.5 cm (%)	20-60 (angular)	30-90 (angular)
PASSING # 4	20-45	10-20
SIEVES (%) # 40	5-25	2-10
#200	<8	<5

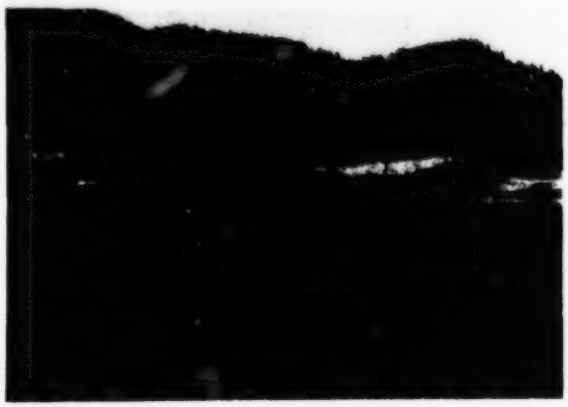
CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-30 cm	>30 cm
SOIL REACTION (pH) 1:1 H_2O	7.8-8.3	8.0-8.4
1:2 0.01M $CaCl_2$	7.3-7.8	7.8-8.1
SALINITY CLASS	non-saline	non to very weakly saline
ORGANIC CARBON	low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	medium	low to very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	very low	low
- K	low	low
BASE SATURATION (%)	100	100
PHOSPHOROUS	medium to high	low
SULFUR	medium	very high

STRUTT SOILS (ST)

GENERAL COMMENTS

Strutt soils occur in scattered, depressional to very gently sloping areas near Summerland, Kaleden and Oliver. They are usually found in association with Gartrell, Ratnip and Kendall soils.

The parent material consists of medium to moderately fine textured fluvial material up to 100 cm thick overlying moderately coarse textured fluvial deposits. Surface and subsurface textures are silt loam or silty clay loam and grade to sandy loam or loamy sand in the lower subsoil. Strutt soils are dominantly poorly drained with some slightly raised imperfectly drained ridges present. The soils are moderately to slowly pervious and have moderate to high water storage capacity. Flooding may occur if the water levels in adjacent streams rise higher than usual. The soil classification is Rego Humic Gleysol.

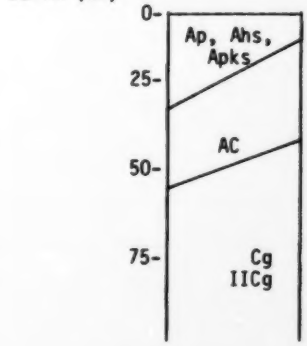


Strutt soils occupy the low-lying fore-and-middle ground.

The main agricultural restrictions are high water table and danger of flooding. Uncleared areas support black cottonwood, water birch, alder and willows. Sedges, cattails, reeds and some grasses are common in the undergrowth. Most larger areas of Strutt soils are cleared, cultivated and used mostly for pasture and forage production.

High water tables and flooding potential severely limit Strutt soils for urban uses. Septic tank effluent disposal is also severely restricted by the high water tables.

GENERALIZED STRUTT SOIL PROFILE



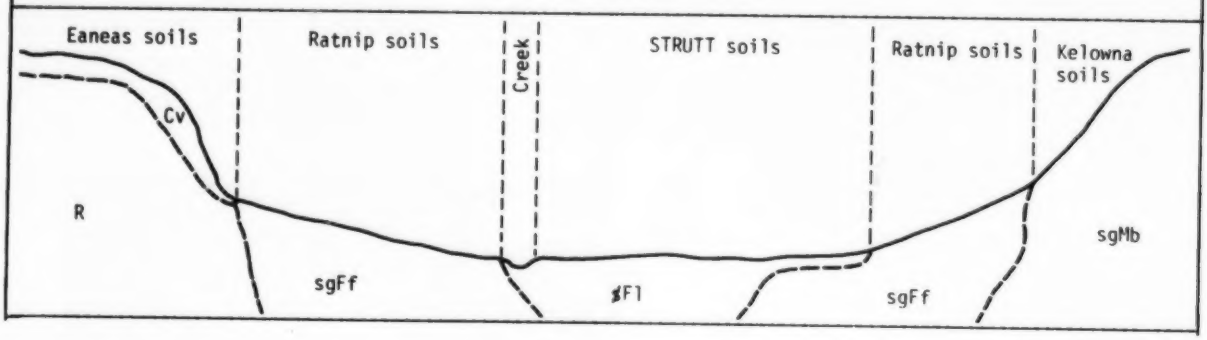
Grayish-brown (10YR 5/2), silt loam or silty clay loam; weak to moderate, fine, granular structure; very friable consistence; weakly to moderately calcareous; moderately saline.

Dark gray to grayish-brown (10YR 4/1-5.5/2), silty clay loam or silt loam; moderate, very fine, subangular blocky structure; friable consistence; weakly calcareous; coarse, medium, distinct yellowish-brown (10YR 4.5/7) mottles.

Light olive gray or pale olive (5Y 6/2.5), loam grading to loamy sand or sand; massive grading to single-grain; few, fine, faint yellowish-brown (10YR 4.5/7) mottles.

TAXONOMIC SOIL CLASSIFICATION: Rego Humic Gleysol: calcareous and saline phases

STRUTT SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: 0-10
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuates between 25 cm and >1 m
PERVIOUSNESS CLASS	: moderate to slow
SOIL DRAINAGE CLASS	: dominantly poor; ranging to imperfect
DEPTH TO ROOT RESTRICTION (cm)	: 70; water table
TOPOGRAPHY	: nearly level and very gentle slopes, sometimes depressional

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	CL-ML	ML-CL	SM (GM)
AASHO TEXTURE SYMBOL	A-6 (A-7)	A-6; A-4	A-2-4; A-4
LIQUID LIMIT	30-35	25-35	25-35
PLASTICITY INDEX	11-15	5-11	4-11
SHEAR STRENGTH	medium to low	medium to low	medium
SOIL TEXTURE	silt loam, silty clay loam	silt loam, sandy loam	loamy sand, sand
PERMEABILITY	moderate to slow	moderate to rapid	rapid to very rapid
AWSC	high	moderate to high	low
COARSE >7.5 cm (%)	0	0	0
FRAGMENTS <7.5 cm (%)	0-3	0-3	0-8
PASSING # 4	100	100	70-100
SIEVES (%) # 40	95-100	90-100	60-90
#200	80-95	80-90	25-80

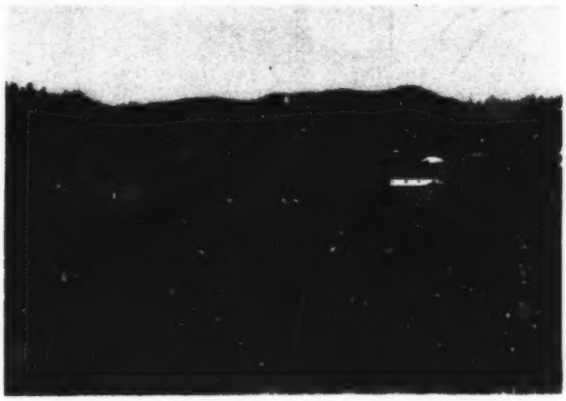
CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-40 cm	40-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.5-8.0	7.7-8.2	7.7-7.9
1:2 0.01M $CaCl_2$	7.4-7.7	7.2-7.8	7.4-7.5
SALINITY CLASS	moderately saline	weakly saline	very weakly saline
ORGANIC CARBON	moderately high	very low	very low
NITROGEN	low to medium	very low	very low
EXCHANGE CAPACITY	high	high to medium	very low to low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	low	low	medium
- K	moderately high	high	high
BASE SATURATION (%)	98-100	100	100
PHOSPHOROUS	low	low	low
SULFUR	very high	very high	very high

SUMMERLAND SOILS (SR)

GENERAL COMMENTS

Summerland soils occur in scattered locales within the Okanagan Valley portion of the map area, mainly near Osoyoos, West Summerland, Westbank and Kelowna. They occupy depressional to gently sloping areas, usually in association with Westbank, Gellatly and Glenmore soils.

Summerland soils have developed in medium to moderately fine textured, calcareous and saline glaciolacustrine sediments. Surface and subsurface textures are silt loam or silty clay loam and grade to clay loam or silty clay loam in the subsoil. The soils are mostly poorly drained but range to imperfectly drained on the tops of some gentle undulations. They are slowly pervious and have a high water holding capacity. Water tables are generally within one metre of the surface throughout the year. Moderately saline and calcareous conditions prevail in the subsoil and often extend to the surface. The soils are classified as Orthic Humic Gleysol: calcareous and saline phase.



A typical example of the slightly depressional location of Summerland soils.

The soils are poorly suited for arable agriculture unless drained. High water tables, flooding potential and salinity are all severe limitations. A few areas are cleared and used for pasture or hay production. Natural vegetation in uncleared areas consists of salt tolerant grasses, sedges and reeds.

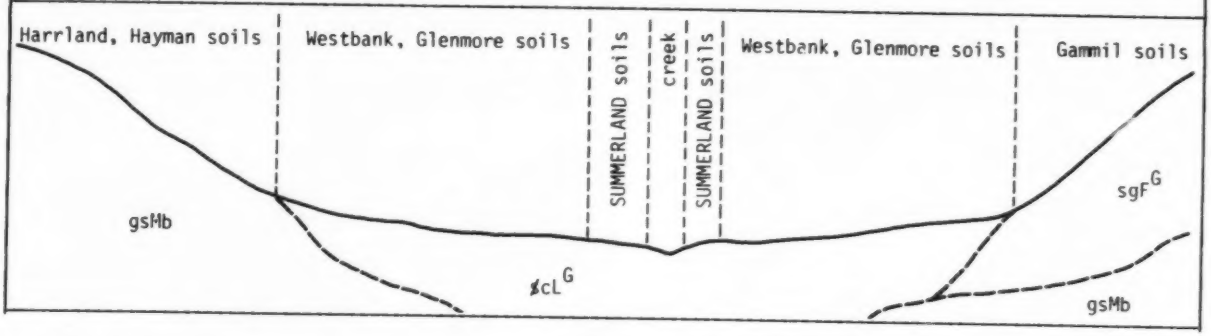
Poor drainage, flooding potential, high salinity, low bearing strength, and high sulphate corrosion hazard are all severe urban constraints. Septic field operations are poor because of high water tables and slow subsoil permeability.

GENERALIZED SUMMERLAND SOIL PROFILE

DEPTH (cm)		
0-	Ap, Ah (Aps)	Grayish brown (10YR 4.5/1.5), silt loam or silty clay loam; weak to moderate, medium platy breaking into moderate, very fine subangular blocky structure; friable consistence; weakly to moderately saline.
25-	Bgsk, Bgtj	Dark gray or dark grayish brown (2.5Y 4.5/1.5), silt loam or silty clay loam; moderate, fine, prismatic breaking into moderate, fine subangular blocky structure; firm consistence; common, fine, faint olive brown (2.5Y 4/2) mottles.
50-	Cgks	Grayish-brown or light brownish gray (2.5Y 5.5/2), silty clay loam or clay loam; moderate to strong, very fine angular blocky structure; sticky consistence; strongly calcareous; moderately saline.
75-		
100-		

TAXONOMIC SOIL CLASSIFICATION: Orthic Humic Gleysol: calcareous and saline phases

SUMMERLAND SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 15
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: usually within 1 m of surface
PERVIOUSNESS CLASS	: slow
SOIL DRAINAGE CLASS	: poor; some to imperfect
DEPTH TO ROOT RESTRICTION (cm)	: 60; water table and salinity
TOPOGRAPHY	: depressional to gently sloping

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	ML-CL	MH-CL
AASHO TEXTURE SYMBOL	A-6; A-7	A-7
LIQUID LIMIT	20-30	30-40
PLASTICITY INDEX	11-15	11-15
SHEAR STRENGTH	medium to low	low
SOIL TEXTURE	silty clay loam; silt loam	clay loam, silty clay loam
PERMEABILITY	slow to moderate	slow to very slow
AWSC	high	high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0-5	0-5
PASSING # 4	100	100
SIEVES (%) # 40	95-100	95-100
#200	85-95	90-95

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
SOIL REACTION (pH) 1:1 H_2O	7.8-8.6	8.4-8.8
1:2 0.01M $CaCl_2$	7.3-8.3	8.0-8.3
SALINITY CLASS	weakly to moderately saline	moderately saline
ORGANIC CARBON	moderate to low	very low
NITROGEN	low	very low
EXCHANGE CAPACITY	medium to high	medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	high	high
- K	moderately high	high
BASE SATURATION (%)	100	100
PHOSPHOROUS	low	low
SULFUR	very high	very high

SUSAP SOILS (SU)

GENERAL COMMENTS

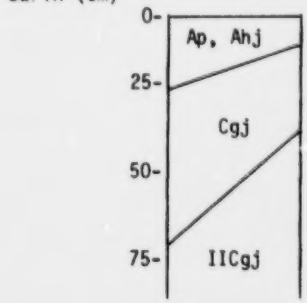
Susap soils are common on the floodplain of the Similkameen River. They occupy nearly level to very gentle slopes, often in association with Nighthawk, Keremeos, Suehumpton and Iltcoola soils.

Susap soils have developed in a moderately coarse textured, gravel-free fluvial veneer, between 25 and 60 cm thick overlying gravelly, coarse textured materials. Surface and subsurface textures are sandy loam or loam and abruptly change to very gravelly sand or loamy sand in the subsoil. The soils are moderately to rapidly pervious, have moderate to slow surface runoff and low to moderate water holding capacity. The groundwater table fluctuates between 50 cm and 2 m from the surface depending on water level. Soil drainage is imperfect. Soil classification is Gleyed Regosol.

The landscape shows an undeveloped area of Susap soils near Cawston.

Cleared and cultivated areas are well suited for a wide variety of climatically suited crops; however, fluctuating water tables and danger of flooding are some limitations for both agricultural and urban uses. Uncleared areas support black cottonwood, willows, grasses, and on higher ridges and undulations, Ponderosa pine. Incomplete effluent filtration in the coarse subsoils may lead to groundwater contamination.

GENERALIZED SUSAP SOIL PROFILE



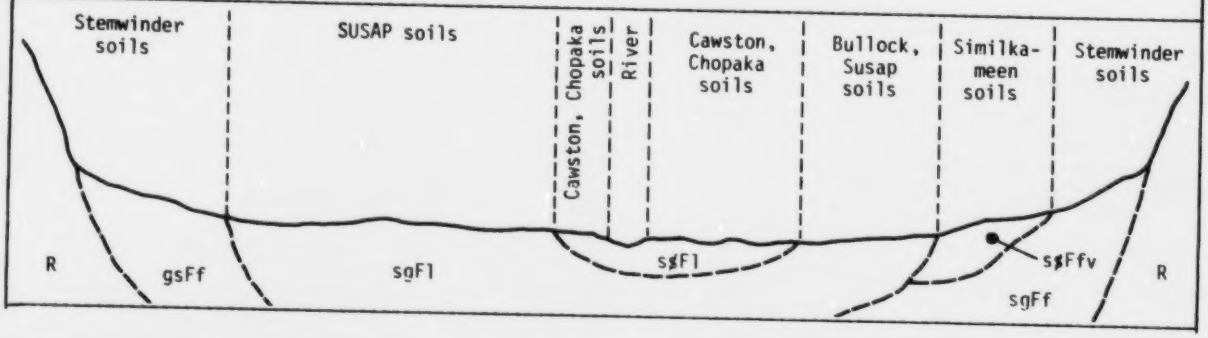
Grayish-brown (10YR 5/2), sandy loam or loam; weak, fine subangular blocky structure; very friable consistence; sometimes few, fine, faint light olive brown (10YR 5/6) mottles.

Light brownish gray to brown (10YR 5.5/2.5), sandy loam, loam or loamy sand; weak to moderate, pseudo-platy breaking into moderate, very fine angular blocky structure; slightly hard consistence; common, fine, distinct light brown (10YR 5/6) mottles.

Yellowish-brown to olive yellow (10YR 6.5/2), very gravelly sand or very gravelly loamy sand; single-grain; loose consistence; few, fine, faint, olive yellow (10YR 6/6) mottles.

TAXONOMIC SOIL CLASSIFICATION: Gleyed Regosol

SUSAP SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: recent fluvial floodplain deposits
DEPTH TO FREE LIME (cm)	: >100
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuates between 0.5 and 2
PERVIOUSNESS CLASS	: rapid to moderate
SOIL DRAINAGE CLASS	: imperfect
DEPTH TO ROOT RESTRICTION (cm)	: 100; water table
TOPOGRAPHY	: depressional to very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-40 cm	>40 cm
UNIFIED TEXTURE SYMBOL	SM-SP	GP-GW
AASHO TEXTURE SYMBOL	A-2-4; A-4; A-3	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loam	very gravelly loamy sand, very gravelly sand
PERMEABILITY	moderate to rapid	very rapid
AWSC	moderate to low	very low
COARSE >7.5 cm (%)	0	5-15
FRAGMENTS <7.5 cm (%)	0	50-85
PASSING # 4	90-100	5-10
SIEVES (%) # 40	60-80	2-8
#200	5-15	<1

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-40 cm	>40 cm
SOIL REACTION (pH) 1:1 H_2O	6.7-7.7	6.6-6.9
1:2 0.01M $CaCl_2$	6.3-7.2	6.2-6.5
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	moderate to low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	low to medium	very low
EXCHANGEABLE CATIONS - Ca	high	low
- Mg	medium	low
- Na	low	low
- K	moderately high	low
BASE SATURATION (%)	80-100	100
PHOSPHOROUS	low to medium	low
SULFUR	medium	low

TANAKA SOILS (TA)

GENERAL COMMENTS

Tanaka soils occur mostly near Kelowna adjacent to Mission Creek and in isolated pockets west of Ellison Lake, the Richter Pass and near Olalla. These nearly level to very gently sloping soils are associated with Guisachan, Rumohr and Winslow soils.

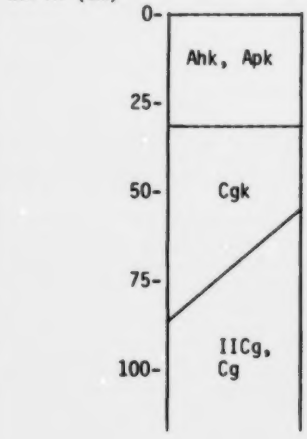
Tanaka soils have developed in the lower aprons of fluvial fans in gravel-free, mostly medium to moderately coarse textured fluvial fan deposits. Surface and subsurface soil textures range from sandy loam to silt loam with occasional silty clay loam. Subsoil textures are sandy loam or gravelly sandy loam. Tanaka soils are poorly to very poorly drained. They are moderately to slowly pervious, have moderate to high water holding capacity and slow surface runoff. The water table fluctuates between the surface and 1.5 metres. Depressional areas are often subject to flooding. The soils are moderately to strongly calcareous and are classified as Rego Humic Gleysol: calcareous phase.

Occurs near Kelowna on very gentle slopes.

Tanaka soils are limited for agricultural uses by high water tables. Developed areas are currently used for pasture and hay, turf, some field crops and vegetables. The natural vegetation in uncleared areas consists of black cottonwood, willow, cattail, sedges, water birch and some grasses.

Severe constraints for urban development are high water tables and poor performance of septic effluent fields.

GENERALIZED TANAKA SOIL PROFILE



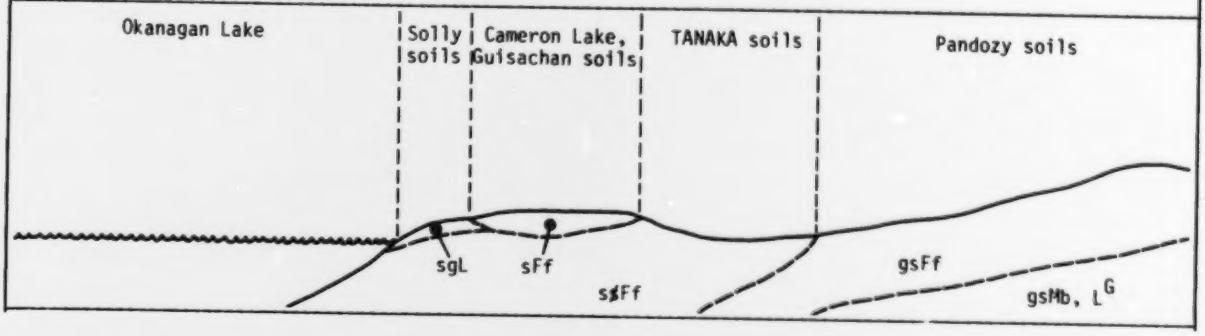
Dark gray (10YR 4/1), sandy loam or silt loam; weak, coarse, prismatic breaking into moderate, very fine subangular blocky structure; friable consistence; moderately calcareous; non or very weakly saline.

Olive gray to light gray (5Y 5/2-7/1), banded sandy loam, silt loam; massive, breaking into weak, fine angular blocky peds; friable to firm consistence; moderately to strongly calcareous; common, fine distinct brown (7.5YR 4/4) mottles.

Light gray (5Y 6/1), sandy loam or gravelly sandy loam; massive, breaking into weak, fine angular blocky peds; friable consistence; weakly calcareous; common, fine distinct or prominent brown (7.5YR 4/4) mottles.

TAXONOMIC SOIL CLASSIFICATION: Rego Humic Gleysol: calcareous phase

TANAKA SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: 0
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuates between surface and 1.5
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: poor to very poor
DEPTH TO ROOT RESTRICTION (cm)	: 60; water table
TOPOGRAPHY	: nearly level and very gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM-SC	SM-ML	SM
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-4	A-4
LIQUID LIMIT	NP	10-25 or NP	15-30
PLASTICITY INDEX	NP	1-5 or NP	1-5
SHEAR STRENGTH	medium to low	medium to low	medium
SOIL TEXTURE	sandy loam, silt loam	silt loam, loam	sandy loam, gravelly sandy loam
PERMEABILITY	moderate	moderate	rapid
AWSC	moderate to high	moderate	low to moderate
COARSE >7.5 cm (%)	0	0	0-5
FRAGMENTS <7.5 cm (%)	0	0-2	5-30
PASSING # 4	-	-	100
SIEVES (%) # 40	-	-	90-100
#200	-	-	5-20

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.7-8.0	8.2-8.3	8.3-8.7
1:2 0.01M $CaCl_2$	7.2-7.6	7.8-8.0	8.0-8.4
SALINITY CLASS	non to very weakly saline	non-saline	non-saline
ORGANIC CARBON	moderate to very low	very low	very low
NITROGEN	low to medium	very low	very low
EXCHANGE CAPACITY	medium	low	very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	very low	medium	medium to high
- K	medium	low	low
BASE SATURATION (%)	100	100	100
PHOSPHOROUS	very low	very low	very low
SULFUR	medium	moderately high	medium

TOMLIN SOILS (TM)

GENERAL COMMENTS

Tomlin soils occur throughout the map area, mostly near Penticton, Okanagan Falls, Summerland, Westbank and Kelowna. The soils occupy moderate to strong slopes, usually in association with Paradise, Trout Creek, Peachland and Hayman soils.

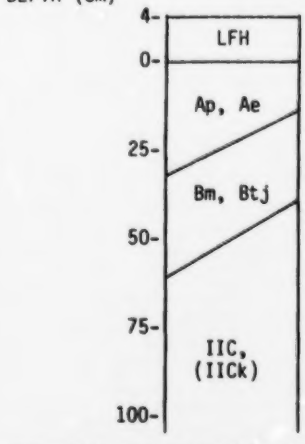
Tomlin soils have developed in deep, moderately coarse to coarse-textured, stony and gravelly fluvial fan deposits. Surface and subsurface textures are usually gravelly sandy loam or gravelly loamy sand. Subsoils are very gravelly loamy sand or very gravelly sand. The soils are well to rapidly drained, rapidly pervious, have low water storage capacity and slow surface runoff. Classification is Eluviated Eutric Brunisol.

The soils are moderately suited for agricultural crop production. Limitations include low water holding capacity, stoniness and, in places, adverse topography. A significant portion is either planted to orchards and vineyards or is used for forage and grazing. Natural vegetation consists of Ponderosa pine, Douglas-fir and grasses in the understory.

Tomlin soils occupy the treed portions of the fluvial fans in the middle distance.

The soils are generally well suited for urban uses although incomplete effluent filtration by the coarse subsoil is possible.

GENERALIZED TOMLIN SOIL PROFILE



Raw to well-decomposed needles, leaves and other forest floor accumulation.

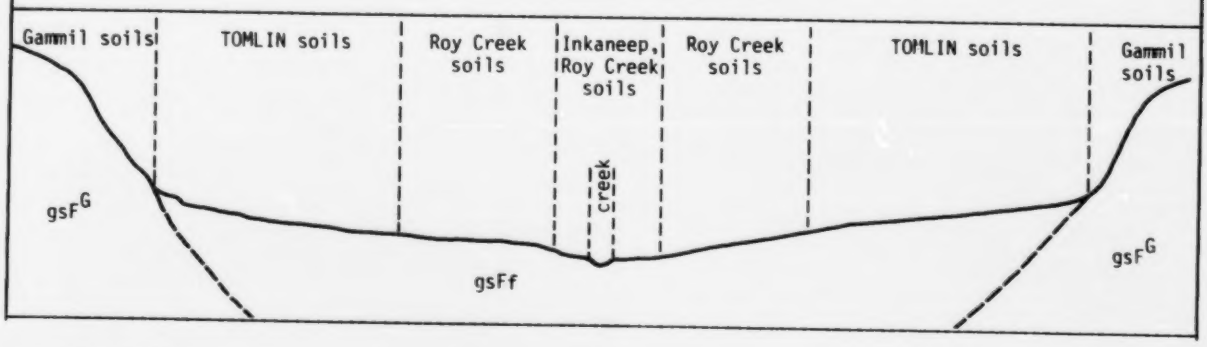
Grayish-brown or brown (10YR 5/2), gravelly sandy loam, sandy loam or gravelly loamy sand; weak, fine to medium subangular blocky structure; slightly hard or friable consistence.

Brown (10YR 5/3), gravelly sandy loam or gravelly loamy sand texture; weak, fine subangular blocky structure; soft to slightly hard consistence.

Pale brown (10YR 5.5/3), gravelly loamy sand or very gravelly loamy sand; massive breaking into weak, very fine subangular blocky peds; loose to soft consistence; non to moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

TOMLIN SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: >50
SURFACE STONINESS CLASS	: variable; 0-3 on fan apron, 3-5 on fan apex
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	SM-SP	GP-GW	GP-GW
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-2-4	A-1
LIQUID LIMIT	NP	NP	NP
PLASTICITY INDEX	NP	NP	NP
SHEAR STRENGTH	high to medium	high	high
SOIL TEXTURE	gravelly sandy loam	gravelly loamy sand	very gravelly loamy sand
PERMEABILITY	rapid to very rapid	very rapid	very rapid
AWSC	low	very low	very low
COARSE >7.5 cm (%)	5-15	10-20	10-20
FRAGMENTS <7.5 cm (%)	15-30	20-40	35-65
PASSING # 4	10-25	10-25	5-25
SIEVES (%) # 40	8-15	5-10	5-10
#200	5-10	<5	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-30 cm	30-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	7.6-8.0	8.4-8.5	8.0-8.5
1:2 0.01M $CaCl_2$	7.1-7.6	7.8-7.9	7.5-8.0
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	low to very low	very low	very low
NITROGEN	very low	very low	very low
EXCHANGE CAPACITY	low	very low	very low
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	low	low	low
- Na	very low	very low	very low
- K	high	high	moderately high
BASE SATURATION (%)	98-100	100	100
PHOSPHOROUS	medium	medium	medium
SULFUR	low	low	low

TREPANIER SOILS (TR)

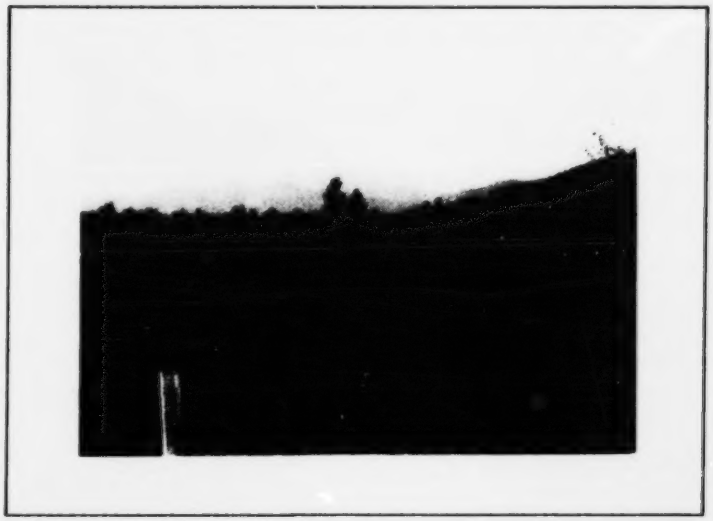
GENERAL COMMENTS

Trepanier soils occur only in a few small areas near Trepanier Creek and Lakeview Heights. They occupy gentle to moderate slopes in association with Paradise and Parkill soils.

Trepanier soils have developed in stone-free, medium to moderately coarse textured, usually stratified fluvioglacial deposits. The surface and subsurface texture is generally loam with variations to fine sandy loam or silt loam. The subsoils vary from silt loam to fine sandy loam and contains lenses of fine sand or, occasionally, silty clay loam. Trepanier soils are well drained, are moderately pervious, and have moderate to high water holding capacity. They are classified as Eluviated Eutric Brunisol.

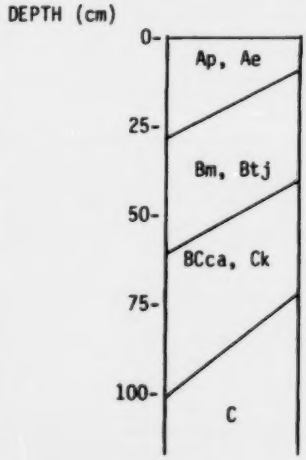
The soils are well suited for most climatically adapted crops although in some areas adverse topography may be limiting. Cleared and cultivated areas are mostly planted to orchards and vineyards. Native vegetation typically consists of Ponderosa pine, Douglas-fir with minor amounts of sagebrush and grass in the understory.

Trepanier soils are well suited for urban uses; no severe restrictions are present.



An area of Trepanier soils planted to grapes.

GENERALIZED TREPANIER SOIL PROFILE



Brown to pale brown (10YR 5/3), loam, silt loam or fine sandy loam; very weak to weak, fine subangular blocky structure; very friable consistence.

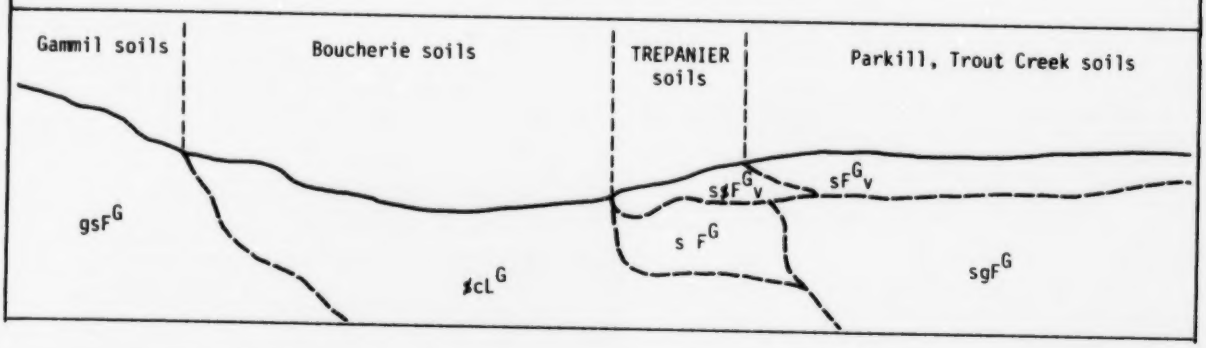
Grayish-brown or light yellowish brown (2.5Y 5.5/3), silt loam; weak to moderate, very coarse, angular blocky breaking into moderate to strong fine angular blocky peds; firm to hard consistence.

Light brownish gray (2.5Y 6/2), silt loam or fine sandy loam; massive breaking into moderate, fine, angular blocky peds; friable consistence; moderately to strongly calcareous.

Olive gray to pale olive (5Y 5.5/2.5), interbedded fine sandy loam, silty clay loam and fine sand; moderate, fine pseudo-platy structure; firm consistence; non to weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

TREPANIER SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: 50
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: moderate
SOIL DRAINAGE CLASS	: well
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: very gentle to moderate slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-100 cm	>100 cm
UNIFIED TEXTURE SYMBOL	ML	SM
AASHO TEXTURE SYMBOL	A-4	A-4; A-2-4
LIQUID LIMIT	15-25 or NP	NP
PLASTICITY INDEX	2-6 or NP	NP
SHEAR STRENGTH	medium to low	medium
SOIL TEXTURE	fine sandy loam, silt loam, loam	silt loam or fine sandy loam with bands of silty clay loam and fine sand
PERMEABILITY	moderate	moderate
AWSC	high	moderate to high
COARSE >7.5 cm (%)	0	0
FRAGMENTS <7.5 cm (%)	0	0-5
PASSING # 4	100	100
SIEVES (%) # 40	60-100	70-85
#200	36-80	36-55

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-100 cm	>100 cm
SOIL REACTION (pH) 1:1 H_2O	7.3-8.5	8.2-8.5
1:2 0.01M $CaCl_2$	6.7-8.2	7.7-8.2
SALINITY CLASS	non to very weakly saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	very low	very low
EXCHANGE CAPACITY	medium	low to medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	high	low
- K	high	low
BASE SATURATION (%)	90-100	100
PHOSPHOROUS	medium	low
SULFUR	very high	low to medium

TROUT CREEK SOILS (TC)

GENERAL COMMENTS

Trout Creek soils occur in scattered locations throughout the Okanagan portion of the map area but are most common in the West Summerland, Peachland and East Kelowna areas. They occupy nearly level to extreme slopes in association with Parkill, Paradise and Harrland soils.

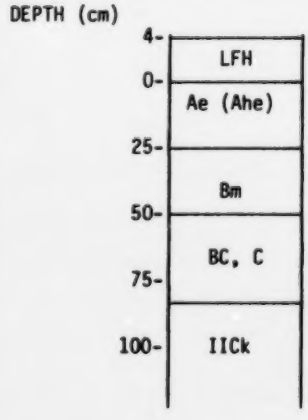
Trout Creek soils have developed in a gravel-free, coarse or moderately coarse textured fluvial veneer between 60 and 100 cm thick overlying gravelly, very coarse textured fluvioglacial deposits. Surface and subsurface textures are sandy loam or loamy sand which change abruptly in the subsoil to very gravelly sand. The soils are well to rapidly drained, rapidly pervious, have moderate to low water storage capacity and slow surface runoff. The soils are classified as Eluviated Eutric Brunisol.

Trout Creek soils occupy the partially cleared foreground and central part of the photo.

Trout Creek soils are well suited for most climatically adapted agricultural crops. Soil limitations are low water holding capacity and, in some areas, adverse topography. Cultivated areas are mostly planted to tree fruits and vineyards; areas with adverse topography are utilized for natural grazing or hay production. Uncleared areas support a vegetation consisting of Ponderosa pine, Douglas-fir and various grasses in the understory.

The soils are well suited for urban and related uses. Bearing capacities are high although incomplete effluent filtration by the coarse subsoil is possible.

GENERALIZED TROUT CREEK SOIL PROFILE



LFH — Raw to well-decomposed needles, leaves and other forest litter.

Ae (Ahe) — Grayish-brown to brown (10YR 5/2.5), sandy loam or loamy sand; weak, medium, platy structure; very friable consistence.

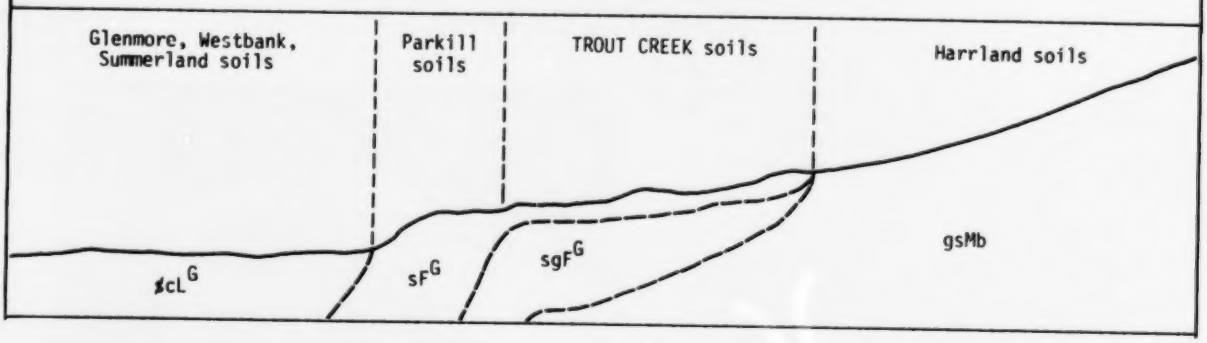
Bm — Pale brown (10YR 6/3), sandy loam or loamy sand; weak to very weak, coarse, subangular blocky structure; very friable consistence.

BC, C — Pale brown to light yellowish brown (10YR 6/3.5), sandy loam or loamy sand; weak to moderate, medium subangular blocky structure; very friable consistence; non to weakly calcareous.

IICk — Pale brown (10YR 6/3-7/4), very gravelly loamy sand or very gravelly sand; single-grain; loose consistence; moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Eluviated Eutric Brunisol

TROUT CREEK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvioglacial deposits
DEPTH TO FREE LIME (cm)	: >50
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none
TOPOGRAPHY	: nearly level to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM	GP
AASHO TEXTURE SYMBOL	A-2-4; A-4	A-1
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	medium	high
SOIL TEXTURE	sandy loam, loamy sand	very gravelly sand, gravelly loamy sand
PERMEABILITY	rapid	very rapid
AWSC	low to moderate	very low
COARSE >7.5 cm (%)	0-2	0-20
FRAGMENTS <7.5 cm (%)	0-5	30-90
PASSING # 4	100	50-70
SIEVES (%) # 40	70-85	5-20
#200	15-40	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.1-8.3	8.3-8.5
1:2 0.01M $CaCl_2$	6.6-7.8	8.0-8.2
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to very low	very low
NITROGEN	low to very low	very low
EXCHANGE CAPACITY	low	very low
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	low to medium	low
- Na	low	low
- K	moderately high	low
BASE SATURATION (%)	80-100	100
PHOSPHOROUS	low	low
SULFUR	low	low

TWIN LAKES SOILS (TL)

GENERAL COMMENTS

Twin Lakes soils are limited to the southern part of the map area, mostly near Olalla. They are usually associated with Stemwinder and Inkaneep soils and occupy gentle to steep slopes.

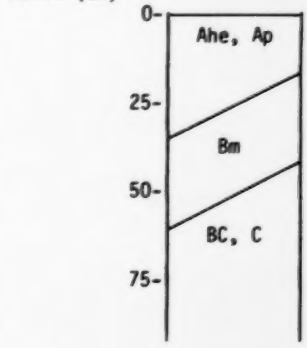
Twin Lakes soils have developed in coarse textured fluvial fan deposits. Surface and subsurface textures are stony and cobbly, very gravelly sandy loam; subsoils are cobbly, very gravelly loamy sand. Coarse fragments generally occupy at least 75% of the soil volume. These Orthic Dark Gray soils are rapidly to well drained, rapidly to moderately pervious and have low water holding capacities.

Twin Lakes soils occupy the fluvial fan in the middle distance.

The soils are moderately suited for some climatically adapted crops. Stony, cobbly and gravelly soil textures, sometimes with adverse topography and low water holding capacity are the main limitations. Cultivated and irrigated sites on gentle to moderate slopes are currently either planted to vineyards or are used for field crops, hay production or grazing. The natural vegetation consists of Douglas-fir, Ponderosa pine, sagebrush, rabbitbrush, juniper and a variety of grasses in the understory.

The soils are moderately limited for urban uses. Excavations may be difficult to construct because of severe stoniness and adverse topography. Incomplete effluent filtration due to coarse subsoil textures is possible. Irregular freshet flooding may occur on the present stream bed.

GENERALIZED TWIN LAKES SOIL PROFILE



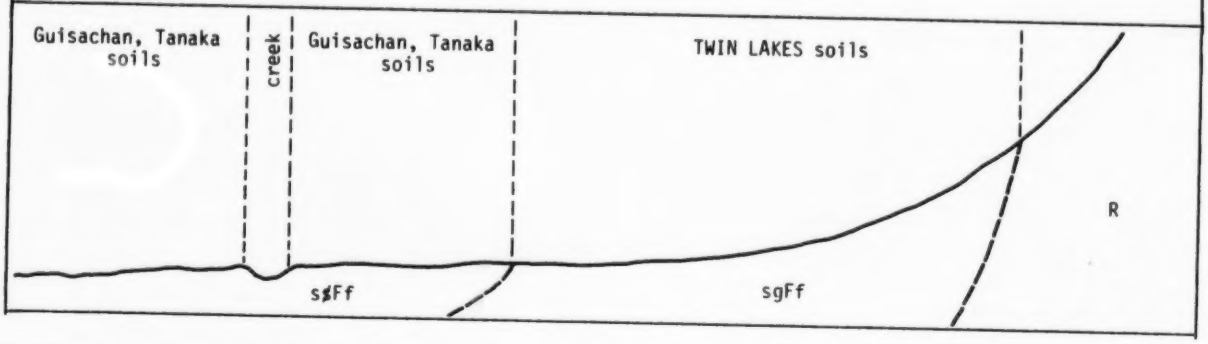
Dark gray, dark grayish brown or grayish brown (10YR 4.5/1.5), cobbly and stony, very gravelly sandy loam; weak to moderate, fine subangular blocky structure; soft consistence.

Dark grayish brown or brown (10YR 4.5/2.5), cobbly and stony, very gravelly sandy loam; weak to moderate, medium, subangular blocky structure; soft consistence.

Grayish-brown (10YR 5.5/2), cobbly and stony, very gravelly loamy sand; single-grain; loose consistence; non to weakly calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Dark Gray

TWIN LAKES SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: >75
SURFACE STONINESS CLASS	: variable; 2-3 on fan apron; 3-5 on fan apex
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: rapid to moderate
SOIL DRAINAGE CLASS	: well to rapid
DEPTH TO ROOT RESTRICTION (cm)	: none, other than that imposed by high component of coarse fragments
TOPOGRAPHY	: gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH	
	0-50 cm	>50 cm
UNIFIED TEXTURE SYMBOL	GW-SM	GW-GP
AASHO TEXTURE SYMBOL	A-2-4	A-2-4
LIQUID LIMIT	NP	NP
PLASTICITY INDEX	NP	NP
SHEAR STRENGTH	high to medium	high
SOIL TEXTURE	stony, cobbly, very gravelly sandy loam	stony, cobbly, very gravelly loamy sand
PERMEABILITY	rapid to moderate	rapid
AWSC	low to very low	very low
COARSE >7.5 cm (%)	30-60	40-60
FRAGMENTS <7.5 cm (%)	20-50	40-50
PASSING # 4	-	5-25
SIEVES (%) # 40	-	<10
#200	-	<2

CHEMICAL SOIL PROPERTIES	SOIL DEPTH	
	0-40 cm	>40 cm
SOIL REACTION (pH) 1:1 H_2O	6.8-7.3	7.2-7.9
1:2 0.01M $CaCl_2$	6.4-6.8	6.7-7.3
SALINITY CLASS	non-saline	non-saline
ORGANIC CARBON	low to moderate	very low
NITROGEN	low to medium	very low
EXCHANGE CAPACITY	medium	low to medium
EXCHANGEABLE CATIONS - Ca	high	high
- Mg	high	high
- Na	very low	very low
- K	very high	high
BASE SATURATION (%)	90-100	100
PHOSPHOROUS	moderately high	medium
SULFUR	low	low

VALLEY CREEK SOILS (VW)

GENERAL COMMENTS

Valley Creek soils occupy gentle to extreme slopes along either side of Okanagan and Skaha lakes where they occur in association with Penticton, Munson, Skaha and Rutland soils.

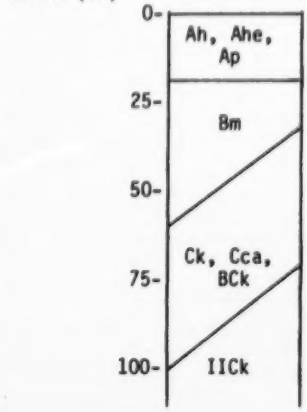
Valley Creek soils have developed in a gravelly, coarse-textured fluvioglacial veneer between 50 and 100 cm thick, overlying medium to moderately fine textured, stratified glaciolacustrine sediments. Surface and subsurface textures range from gravelly sandy loam to gravelly loamy sand. Subsoil textures are gravel-free, silt loam or silty clay loam. The glaciolacustrine subsoil is usually weakly to moderately saline. Valley Creek soils are well to rapidly drained in the upper soil, have moderate to rapid permeability, low to moderate water holding capacity and slow surface runoff. They are classified as Orthic Brown.

Valley Creek soils occur along the contact between the steeply sloping mountain wall and the glaciolacustrine terrace.

Low water holding capacity and often, adverse topography, limit Valley Creek soils for some agricultural uses. Cultivated areas are typically used for tree fruits or vineyards. Native vegetation consists of grasses, sagebrush and rabbitbrush with scattered Ponderosa pine in ravines and gullies.

Valley Creek soils are very limited for building sites often by adverse topography and with variable bearing strength in the subsoil. Placement of septic filter fields should be carefuly determined since effluent may seep downslope along the interface between the coarse, gravelly upper soil and the fine silty subsoil.

GENERALIZED VALLEY CREEK SOIL PROFILE



Grayish-brown or brown (10YR 5/2.5), sandy loam or gravelly sandy loam; weak, very fine subangular blocky structure; very friable consistence.

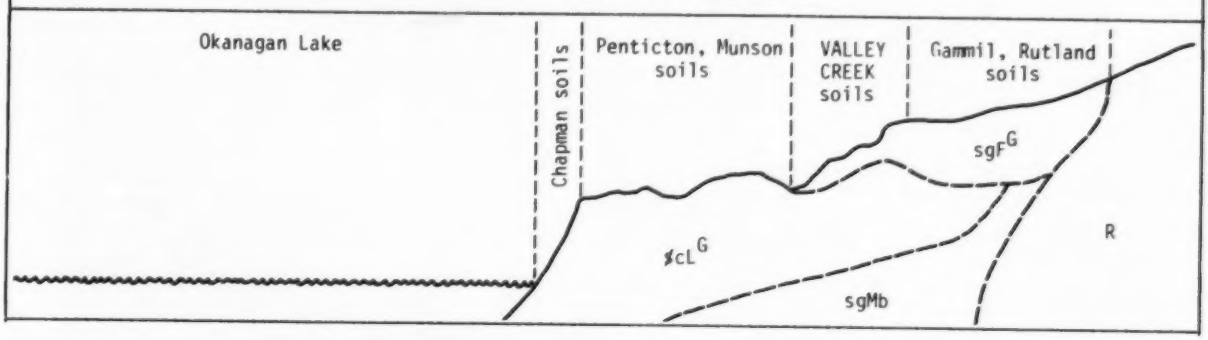
Pale brown or brown (10YR 5.5/3), gravelly loamy sand or gravelly sandy loam; weak, very fine to fine, subangular blocky structure; very friable consistence.

Pale brown (10YR 6/3), gravelly sandy loam or gravelly loamy sand; weak, fine, subangular blocky structure; slightly hard consistence; moderately to strongly calcareous.

Light brownish gray (2.5Y 6/2), silt loam; moderate, fine, pseudoplaty structure; firm consistence; moderately calcareous.

TAXONOMIC SOIL CLASSIFICATION: Orthic Brown

VALLEY CREEK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	:	>2
PARENT MATERIAL	:	fluvioglacial veneer over glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	:	70
SURFACE STONINESS CLASS	:	0-2
DEPTH TO WATERTABLE (m)	:	>2
PERVIOUSNESS CLASS	:	rapid to moderate
SOIL DRAINAGE CLASS	:	well to rapid
DEPTH TO ROOT RESTRICTION (cm)	:	80; compact subsoil
TOPOGRAPHY	:	gentle to extreme slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-80 cm	>80 cm
UNIFIED TEXTURE SYMBOL	SM-GM	SM-GM	ML
AASHO TEXTURE SYMBOL	A-4	A-2-4	A-4
LIQUID LIMIT	NP	NP	30-50
PLASTICITY INDEX	NP	NP	5-10
SHEAR STRENGTH	medium to high	high to medium	medium to low
SOIL TEXTURE	sandy loam, gravelly sandy loam	gravelly sandy loam, gravelly loamy sand	silt loam, silty clay loam
PERMEABILITY	rapid	rapid to very rapid	moderate to slow
AWSC	moderate	low	high
COARSE FRAGMENTS >7.5 cm (%)	5-20	10-20	0
COARSE FRAGMENTS <7.5 cm (%)	10-25	15-45	0
PASSING SIEVES (%) # 4	-	-	100
PASSING SIEVES (%) # 40	-	-	100
PASSING SIEVES (%) #200	-	-	99

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-20 cm	20-80 cm	>80 cm
SOIL REACTION (pH) 1:1 H_2O	7.3-7.8	7.4-8.5	8.4-8.8
SOIL REACTION (pH) 1:2 0.01M $CaCl_2$	6.9-7.2	6.9-8.1	8.1-8.3
SALINITY CLASS	non-saline	non-saline	weakly to mod. saline
ORGANIC CARBON	low	very low	very low
NITROGEN	very low	very low	very low
EXCHANGE CAPACITY	low	low to very low	low
EXCHANGEABLE CATIONS - Ca	high	high	high
EXCHANGEABLE CATIONS - Mg	medium	high	high
EXCHANGEABLE CATIONS - Na	low	low	high
EXCHANGEABLE CATIONS - K	high	low	medium
BASE SATURATION (%)	95-100	100	100
PHOSPHOROUS	low to medium	medium	high
SULFUR	medium	low	high to very high

WESTBANK SOILS (WK)

GENERAL COMMENTS

Westbank soils are mainly located east of Westbank, within the Glenmore Valley north of Kelowna and near Ellison. The soils occupy nearly level to strong slopes in association with Glenmore, Boucherie, McKinley and Summerland soils.

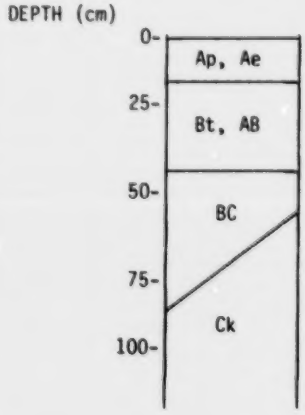
The parent material of Westbank soils consists of fine to moderately fine textured glaciolacustrine deposits. Surface and subsurface textures are silty clay loam, clay loam or clay. Subsoil textures are clay or heavy clay but may become sandy below about 200 cm. Westbank soils are moderately well drained, slowly pervious and have high water holding capacity. Soil classification is Orthic Gray Luvisol.

Westbank soil areas are essentially all cultivated and either planted to tree fruits and vineyards or are used for hay production or pasture. The soils are moderately suited for agricultural crops although dense, clayey subsoils inhibit root growth and water movement. Pudding and structure degradation occurs if the soils are cultivated when wet. Uncleared areas support scattered Ponderosa pine, grasses and shrubs.

Westbank soils occupy the foreground of the photo.

Westbank soils are very limited for urban and related uses by low bearing strengths and subsoil salinity. The efficient operation of a septic filter field is severely restricted by the very slow subsoil permeability. Underground installations may require special corrosion protection.

GENERALIZED WESTBANK SOIL PROFILE



Grayish-brown (10YR 5/2), silty clay; moderate, coarse, platy breaking into moderate to strong, coarse, subangular blocky peds; firm (when moist) or extremely hard (when dry) consistence.

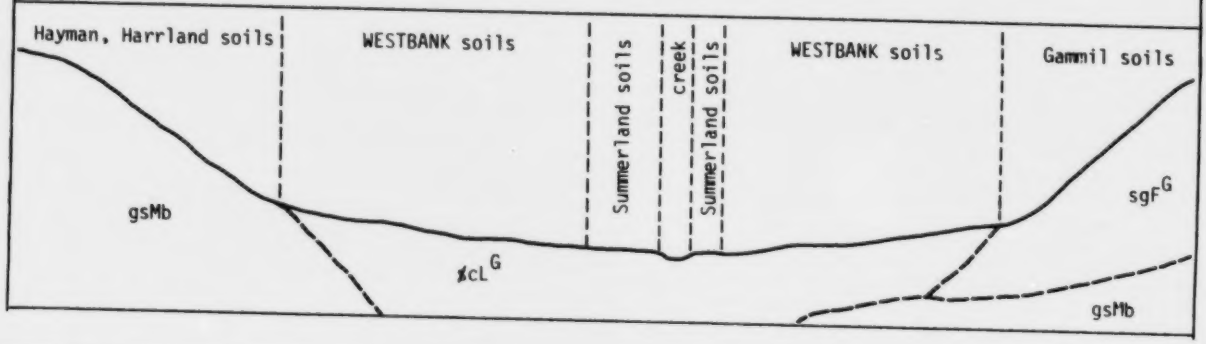
Dark grayish brown ((10YR 4/2), clay; moderate to strong, coarse, prismatic breaking into strong, medium, angular blocky peds; firm to very firm consistence.

Grayish-brown or dark grayish brown (10YR 4.5/2), clay or clay loam; strong, medium, prismatic breaking into strong, medium, angular blocky peds; very firm consistence; non or weakly calcareous.

Grayish-brown to pale brown (10YR 5.5/2.5), clay or heavy clay; moderate to strong, medium, pseudo-platy structure; very firm consistence; moderately calcareous; weakly saline with gypsum crystals throughout lower Ck horizon.

TAXONOMIC SOIL CLASSIFICATION: Orthic Gray Luvisol

WESTBANK SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: glaciolacustrine sediments
DEPTH TO FREE LIME (cm)	: 40-70
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: >2
PERVIOUSNESS CLASS	: slow
SOIL DRAINAGE CLASS	: moderately well
DEPTH TO ROOT RESTRICTION (cm)	: 25; compact, clay enriched layer
TOPOGRAPHY	: nearly level to strong slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-75 cm	>75 cm
UNIFIED TEXTURE SYMBOL	CH	CH-MH	CH-MH
AASHO TEXTURE SYMBOL	A-7	A-7	A-7
LIQUID LIMIT	55-70	55-70	55-70
PLASTICITY INDEX	25-40	25-40	25-30
SHEAR STRENGTH	medium to low	medium to low	low
SOIL TEXTURE	clay, silty clay loam, clay loam	clay, heavy clay	clay, heavy clay
PERMEABILITY	very slow	very slow	very slow
AWSC	high	high	high
COARSE >7.5 cm (%)	0	0	0
FRAGMENTS <7.5 cm (%)	0	0	0
PASSING # 4	100	100	100
SIEVES (%) # 40	100	100	100-98
#200	98	98-100	96-100

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-75 cm	>75 cm
SOIL REACTION (pH) 1:1 H_2O	6.5-7.0	7.2-7.6	7.5-7.9
1:2 0.01M $CaCl_2$	6.0-6.6	7.0-7.3	7.0-7.5
SALINITY CLASS	non-saline	non-saline	weakly saline
ORGANIC CARBON	low to medium	low	very low
NITROGEN	low	low	very low
EXCHANGE CAPACITY	high	high	high
EXCHANGEABLE CATIONS - Ca	high	high	high
- Mg	high	high	high
- Na	very low to low	medium	medium to high
- K	very high	high	high
BASE SATURATION (%)	85-100	98-100	100
PHOSPHOROUS	high	medium	low
SULFUR	low to medium	medium	very high

WINSLOW SOILS (WW)

GENERAL COMMENTS

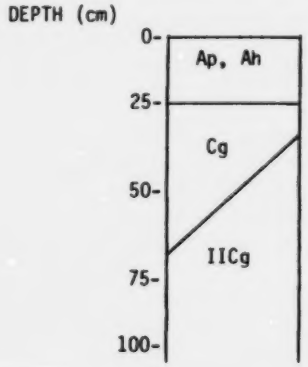
Winslow soils are scattered througout the Okanagan Valley portion of the map area and occur on most of the nearly level to gently sloping aprons of fluvial fans. Tanaka, Guisachan, Roy Creek, Inkaneep and Ratnip soils commonly occur in association with Winslow soils.

Winslow soils have developed in a 10 to 50 cm thick, moderately coarse to medium textured, gravel-free veneer which overlies gravelly, coarse-textured fluvial fan deposits. Surface and subsurface textures are usually sandy loam or occasionally loam; these change to gravelly loamy sand (or sometimes loamy sand) in the subsoil. These Rego Humic Gleysol soils are dominantly poorly drained but range to imperfectly drained on slightly elevated ridges. They are moderately to rapidly pervious and have moderate to low water holding capacity. Water tables generally fluctuate between 50 and 150 cm and some areas near the lake's edge are subject to flooding.

Winslow soils occur on the gentle slopes in the middle portion of the photo near Okanagan Lake.

Winslow soils are moderately well suited for climatically adapted crops if drained. Most areas of are cultivated for either pasture, field crops or tree fruits. A few uncleared areas support willows, black cottonwood and other shrubs. High, fluctuating water tables severely limit urban uses. Coarse subsoil textures may provide inefficient filtration and purification of septic tank effluent.

GENERALIZED WINSLOW SOIL PROFILE



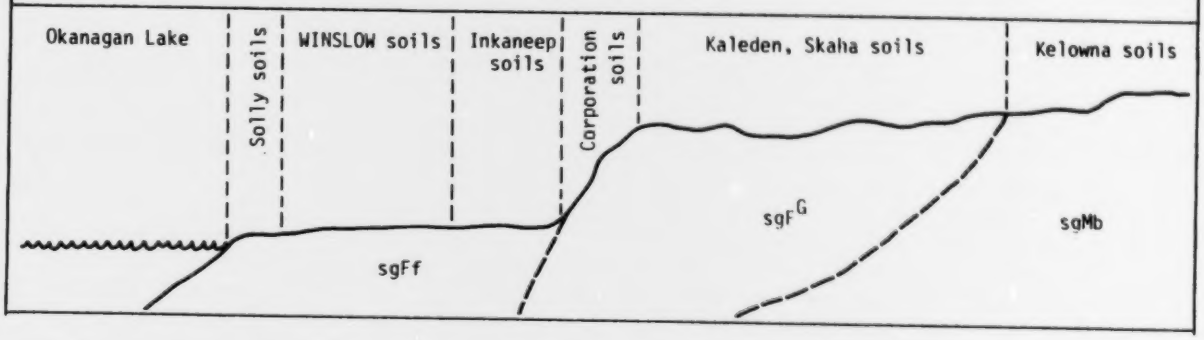
Dark gray to dark grayish brown (10YR 4/1.5), sandy loam or loam; moderate, fine to very fine, subangular blocky structure; slightly hard consistence; non to weakly calcareous.

Brown or pale brown (10YR 5.5/3), sandy loam or loam; weak, fine subangular blocky structure; soft consistence; weakly calcareous; many, medium, strong brown (7.5YR 5/6) mottles.

Light gray to pale brown (10YR 6/1-6/4), very gravelly loamy sand; single-grain; loose consistence; common, medium, strong brown (7.5YR 5/6) mottles.

TAXONOMIC SOIL CLASSIFICATION: Rego Humic Gleysol

WINSLOW SOIL LANDSCAPE CROSS SECTION



SOIL CHARACTERISTICS

DEPTH TO BEDROCK (m)	: >2
PARENT MATERIAL	: fluvial fan deposits
DEPTH TO FREE LIME (cm)	: >25; variable
SURFACE STONINESS CLASS	: 0
DEPTH TO WATERTABLE (m)	: fluctuating between 0.5 and 1.5
PERVIOUSNESS CLASS	: moderate to rapid
SOIL DRAINAGE CLASS	: dominantly poor, ranging to imperfect
DEPTH TO ROOT RESTRICTION (cm)	: 80; groundwater
TOPOGRAPHY	: nearly level to gentle slopes

PHYSICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-40 cm	>40 cm
UNIFIED TEXTURE SYMBOL	SM	SM	GW-GP
AASHO TEXTURE SYMBOL	A-2-4 (A-4)	A-2-4	A-2-4
LIQUID LIMIT	NP	NP	NP
PLASTICITY INDEX	NP	NP	NP
SHEAR STRENGTH	medium	medium	high to medium
SOIL TEXTURE	sandy loam, loam	loam, sandy loam	very gravelly loamy sand
PERMEABILITY	moderate to rapid	moderate to rapid	rapid to very rapid
AWSC	moderate	moderate	low to very low
COARSE >7.5 cm (%)	0-5	0-5	<5
FRAGMENTS <7.5 cm (%)	5-15	5-15	30-60
PASSING # 4	-	-	15-30
SIEVES (%) # 40	-	-	5-15
#200	-	-	<5

CHEMICAL SOIL PROPERTIES	SOIL DEPTH		
	0-25 cm	25-40 cm	>40 cm
SOIL REACTION (pH) 1:1 H_2O	7.5-7.9	7.8-8.2	7.0-7.5
1:2 0.01M $CaCl_2$	7.0-7.5	7.5-7.8	6.6-6.9
SALINITY CLASS	non-saline	non-saline	non-saline
ORGANIC CARBON	moderate	very low	very low
NITROGEN	low	low to very low	very low
EXCHANGE CAPACITY	medium to high	low	very low
EXCHANGEABLE CATIONS - Ca	high	high	medium
- Mg	high	medium to high	low to medium
- Na	low	low	very low
- K	90-100	100	100
BASE SATURATION (%)	medium to high	medium to high	very low
PHOSPHOROUS	very low	very low	very low
SULFUR	medium	high	moderately high

MISCELLANEOUS LAND TYPES

Miscellaneous land types consist of naturally occuring or man-made components of the landscape but are not considered to be "soil" as defined in this report.

Five different land types were recognized:

Gravel and Sand Pits (MLA) - consists of active and inactive areas of granular material extraction sufficiently large enough to be mapped at the time of survey.

Land Fill, Cut and Fill, or Levelled Areas (MLB) - consists of man-made features or areas that have been so severely modified that the original has been destroyed.

Bedrock Outcrop (MLC) - consists of exposed bedrock or bedrock areas with less than 10 cm of soil on the rock surface.

Dykes (MLD) - these occur along portions of the Okanagan and Similkameen rivers.

Dry River Channels (MLE) - consists of gravel bars and similar deposits exposed during low water in the Similkameen and Okanagan rivers.

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GLOSSARY

AASHO, classification, soil engineering - The official classification of soil materials and soil aggregate mixtures for highway construction used by the American Association of State Highway Officials.

acid soil - A soil material having a pH of less than 7.0.

aggregate - Sand, gravel and other similar mineral material suitable for use in construction (i.e. for road surfaces, concrete, pavement).

aggregate, soil - A group of soil particles cohering, in such a way that they behave mechanically as a unit.

alluvial (fluvial) fan - A fan shaped deposit of alluvium laid down by a stream where it emerges from an upland into less steeply sloping terrain.

alluvium - A general term for all deposits of rivers and streams.

anthropogenic - Man-made, or strongly man-modified, soil materials.

arable soil - Soil suitable for plowing and cultivation.

aspect - A measure of orientation of a slope by means of compass points.

Atterberg Limits (Plastic Limits) - The range of water content over which a soil exhibits plastic behaviour. The Lower Atterberg Limit is the water content at which the soil is not plastic when worked and crumbles on application of pressure. The Upper Atterberg Limit is the water content at which the soil changes from a plastic state to flow behaviour.

available nutrient - The portion of any element or compound in the soil that can be readily absorbed and assimilated by growing plants.

available soil water - The portion of water in a soil that can be readily absorbed by plant roots; generally considered to be the water held in the soil up to approximately 15 atmospheres tension.

base saturation - The extent to which the adsorption complex of a soil is saturated with exchangeable cations other than hydrogen and aluminum. It is expressed as a percentage of the total cation exchange capacity.

beach deposits - Sediments that are modified in their degree of sorting, or surface relief, or both, by the action of waves in forming beaches.

bearing capacity - The average load per unit area that is required to rupture a supporting soil mass.

GLOSSARY (CONTINUED)

bedrock - The solid rock that underlies soil and the regolith, or that is exposed at the surface.

blanket - A mantle of unconsolidated material thick enough to mask minor irregularities in the underlying rock or other deposits, but which still conforms to the general underlying topography.

bog - An area covered, or filled with, peat material which generally consists of undecomposed to moderately decomposed organic material.

boulders - Rock fragments over 60 cm (2 ft) in diameter. In engineering practice boulders are greater than 20 cm (8 inches) in diameter.

Brunisolic - An order of soils whose horizons are developed sufficiently to exclude the soils from the Regosolic order, but that lack the degrees or kinds of horizon development specified for soils of the other orders. These soils, which occur under a wide variety of climatic and vegetative conditions, all have Bm or Btj horizons. The great groups Melanic Brunisol, Eutric Brunisol, Sombric Brunisol and Dystric Brunisol belong in this order.

bulk density, soil - The mass of dry soil per unit bulk volume. The bulk volume is determined before the soil is dried to constant weight at 105°C.

calcareous soil - Soil containing sufficient calcium carbonate, often with magnesium carbonate, to effervesce visibly when treated with cold 0.1 N hydrochloric acid.

carbon-nitrogen ratio (C/N ratio) - The ratio of the weight of organic carbon to the weight of total nitrogen in a soil or in an organic material.

cation exchange - The interchange of a cation in solution and another cation on the surface of any surface-active material such as clay colloid or organic colloid.

cation exchange capacity (CEC) - A measure of the total amount of exchangeable cations that can be held by a soil. It is expressed in milliequivalents per 100 g of soil.

Chernozemic - An order of soils that have developed under xerophytic or mesophytic grasses and forbs, or under grassland-forest transition vegetation, in cool to cold, subarid to subhumid climates. The soils have a dark-coloured surface (Ah, Ahe, or Ap) horizon and a B or C horizon, or both, of high base saturation. The order consists of the Brown, Dark Brown, Black, and Dark Gray great groups.

chroma - The relative purity, strength, or saturation of a colour. It is directly related to the dominance of the determining wavelength of light. It is one of the three variables of colour. See also **Munsell colour system; hue;** and **value, colour.**

GLOSSARY (CONTINUED)

classification, soil - The systematic arrangement of soils into categories on the basis of their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties.

clay - (i) As a particle term: a size fraction less than 0.002 mm in equivalent diameter, or some other limit (geologist and engineers). (ii) As a rock term: a natural, earthy, fine grained material that developes plasticity with a small amount of water. (iii) As a soil term: a textural class in which the soil materials contain 40 percent or more of clay. (iv) As a soil separate: a material usually consisting largely of clay material but commonly also of amorphous free oxides and primary minerals.

clay films (skins) - Coatings of oriented clays on the surface of soil peds and mineral grains.

clay loam - Soil material that contains 27% to 40% clay and 20% to 45% sand.

clay mineral - Finely crystaline hydrous aluminum silicates and hydrous magnesium silicates with phyllosilicate structure.

clayey - Containing large amounts of clay, or having properties similar to those of clay.

climatic moisture deficit - The negative difference between precipitation and the potential evapotranspiration from May 1st to September 30th.

climatic moisture surplus - The positive difference between precipitation and the potential evapotranspiration from May 1st to September 30th.

coarse fragments - Rock or mineral particles greater than 2.0 mm in diameter.

coarse texture - The texture exhibited by sands, loamy sand, and sandy loams except very fine sandy loam. A soil containing large quantities of these textural classes.

cobble - Rounded or partially rounded rock or mineral fragment 7.5 to 25 cm (3 to 10 inches) in diameter. In engineering practice, cobbles are greater than 7.5 cm (3 inches) but less than 20 cm (8 inches) in diameter.

colluvium - Loose material accumulated on and at the foot of slopes by the various processes of mass movement (gravity). Highly variable textures depending on source material (often boulder-sized material). Unsorted to crudely stratified.

colour, soil - Soil colours are compared with a Munsell colour chart. The Munsell system specifies the relative degrees of the three simple variables of colour; hue, value and chroma. For example: 10YR 6/4 means a hue 10YR, a value of 6, and a chroma of 4. See also **Munsell colour system; hue;** and **value, colour.**

compaction, soil - The packing together of soil particles by forces exerted at the soil surface resulting in increased soil density.

GLOSSARY (CONTINUED)

concretion - A mass or concentration of a chemical compound, such as calcium carbonate or iron oxide, in the form of a grain or nodule of varying size, shape, hardness, and color, found in soil and in rock. The term is sometimes restricted to concentrations having concentric fabric. The composition of some concretions is unlike that of the surrounding material.

conductivity, electrical - A physical quantity that measures the readiness with which a medium transmits electricity. It is expressed as the reciprocal of the electric resistance (millisiemens) or mS per cm at 25°C of a conductor which is one cm long with a cross sectional area of one square cm. It is used to express the concentration of salt in irrigation water or soil extracts.

consistence - (I) The resistance of a material to deformation or rupture. (II) The degree of cohesion or adhesion of the soil mass. Terms used for describing consistence at various soil moisture contents are:

wet soil - nonsticky, slightly sticky, sticky, and very sticky; nonplastic, slightly plastic, plastic, and very plastic.
moist soil - loose, very friable, friable, firm, and very firm;
dry soil - loose, soft, slightly hard, hard, very hard, and extremely hard.
cementation - weakly cemented, strongly cemented, and indurated.

degradation, soil - The changing of soil to a more highly leached and more highly weathered condition, usually accompanied by morphological changes such as the development of an eluviated, light-coloured (Ae) horizon.

delta - A fluvial or glaciofluvial deposit which is a relatively level (0-25% slopes) usually triangular shaped form occurring at the mouth of a stream as it enters a lake or ocean. May have numerous presently occupied or abandoned channels which appear as an integrated drainage pattern.

deposit - Material left in a new position by a natural transporting agent such as water, wind, ice, or gravity, or by the activity of man.

drainage, soil - (1) The rapidity and extent of the removal of water from the soil by runoff and flow through the soil to underground spaces. (2) As a condition of the soil, it refers to the frequency and duration of periods when the soil is free of saturation.

dunes - Wind-built ridges and hills of sand.

ecology - The study of the relationship between living organisms and their environment.

eluviation - The transportation of soil material in suspension or in solution within the soil by the downward or lateral movement of water.

eolian deposit - Sand, or silt, or both, deposited by the wind, See also loess and dunes.

GLOSSARY (CONTINUED)

erosion - The group of processes whereby surficial or rock materials are loosened, or dissolved and removed from any part of the earth's surface. It includes the processes of weathering, solution, corrosion and transportation.

evapotranspiration - The combined loss of soil water from a given area during a specific period of time by evaporation from the soil surface and transpiration from plants.

exchange capacity - The total ionic charge of the adsorption complex that is active in the adsorption of ions.

fan - Fluvial deposits which are level to steeply sloping (0-50%) fan-like form occurring where a stream flows out onto a level plain or meets a slower moving stream. Fans are often marked by variegated current scars, abandoned and presently occupied channels. Noticeable slope towards the fan toe or apron.

fen - An area covered by peat material which generally consists of well to moderately decomposed sedge and reed vegetation.

fertility, soil - The status of a soil with respect to the amount and availability of elements necessary for plant growth.

fibric layer - A layer of organic soil material containing large amounts of weakly decomposed fiber whose botanical origin is readily identifiable.

field capacity - The percentage of water remaining in the soil 2 or 3 days after the soil has been saturated and free drainage has practically ceased. The percentage may be expressed in terms of weight or volume.

fine texture - Consisting of or containing large quantities of the fine fractions, particularly of silt and clay. It includes all the textural classes of clay loams and clays: clay loam, sandy clay loam, silty clay loam, sandy clay, silty clay, and clay. Sometimes it is subdivided into clayey texture and moderately fine texture.

firm - A term describing the consistence of a moist soil that offers distinctly noticeable resistance to crushing, but can be crushed with moderate pressure between the thumb and forefinger.

floodplain - The land bordering a stream or river built up of sediments from overflow of the stream and subject to inundation when the stream is at flood stage.

fluvial, deposits - Materials laid down by recent streams and rivers. Variable textures (few boulders or coarse fragments). Moderately well to well sorted and stratified.

fluvioglacial, deposits - Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and may occur in the form of outwash plains, deltas, kames, eskers, and kame terraces.

GLOSSARY (CONTINUED)

friable - Soil aggregates that are soft and easily crushed between thumb and forefinger.

genesis, soil - The mode of origin of the soil, especially the processes or soil-forming factors responsible for the development of the solum from unconsolidated parent material.

geomorphology - The study of landforms as they relate to geologic composition and history.

glacial till - Materials deposited by ice directly without intervening transportation by water. Variable textures (most often heterogeneous mixture of sands, silts and clays - some often stony and bouldery). Unsorted and unstratified.

gleyed soil - An imperfectly or poorly drained soil in which the material has been modified by reduction or alternating reduction and oxidation. These soils have lower chromas or more prominent mottling or both in some horizons than the associated well-drained soils.

gleysation - A soil-forming process, operating under poor drainage conditions, which results in the reduction of iron and other elements and in gray colours, and mottles.

Gleysolic - An order of soils developed under wet conditions and permanent or periodic reduction. These soils have low chromas, or prominent mottling, or both, in some horizons.

gravel - Rock fragments 2 mm to 7.5 cm in diameter.

gravelly - Containing appreciable or significant amounts of gravel. The term is used to describe soils or lands.

great group - A category in the Canadian system of soil classification. It is a taxonomic group of soils having certain morphological features in common and a similar pedogenic environment.

groundwater - Water that is passing through or standing in the soil and the underlying strata. It is free to move by gravity.

horizon, soil - A layer of soil or soil material approximately parallel to the land surface, it differs from adjacent genetically related layers in properties such as colour, structure, texture, consistence, and chemical, biological and mineralogical composition. A list of the designations and properties of soil horizons may be found in the Canadian System of Soil Classification, 1978.

horizon boundary - Horizon boundaries are indicated by distinctness and form. The distinctness of a horizon boundary depends partly on the degree of contrast with the adjacent lower horizon and partly on the thickness of any transition zone between them.

hue - The aspect of colour that is determined by the wavelengths of light, and changes with the wavelength. Munsell hue notations indicate the visual relationship of a colour to red, yellow, green, blue, or purple, or an intermediate of these hues. See also **Munsell colour system, chroma,** and **value, colour.**

GLOSSARY (CONTINUED)

humus - That more or less stable fraction of the soil organic matter remaining after most of the added plant and animal residues have decomposed.

ice contact - Fluvioglacial deposits laid down along the margins of glaciers.

igneous rock - Rock formed by the cooling and solidification of magma. It has not been changed appreciably since its formation.

illuvial horizon - A soil horizon in which material carried from an overlying layer has been precipitated from solution or deposited from suspension.

illuviation - The process of depositing soil material removed from one horizon in the soil to another, usually from an upper to a lower horizon in the soil profile. Illuviated substances include silicate clay, hydrous oxides of iron and aluminum, and organic matter.

impeded drainage - A condition that hinders the movement of water by gravity through soils.

impervious - Resistant to penetration by fluids or roots.

inclusion - Soil types found within a mapping unit which are not extensive enough to be mapped separately or as part of a soil complex.

infiltration - The downward entry of water into the soil.

infiltration rate - A soil characteristic determining or describing the maximum rate at which water can enter the soil under specified conditions, including the presence of excess water.

inorganic soil - A soil made up mainly of mineral particles; a soil containing less than 17% organic carbon.

irrigation - The artificial application of water to the soil for the benefit of growing crops.

kame - An irregular ridge or hill of stratified glacial drift deposited by glacial meltwater.

Kettle - Depression left after the melting of a mass of glacier ice buried in drift.

lacustrine deposits - Sediments that have settled from suspension in bodies of standing fresh water and are later exposed by lowering the water level or by up-lifting of the land.

land - The solid part of the earth's surface or any part thereof. A tract of land is defined geographically as a specific area of the earth's surface. Its characteristics embrace all reasonably stable, or predictably cyclic, attributes of the biosphere vertically above and below this area, including those of the atmosphere, the soil, and the underlying geology, the hydrology, the plant and animal populations, and the results of past and present human activity, to the extent that these attributes exert a significant influence on the present and future use of land by man.

GLOSSARY (CONTINUED)

land classification - The arrangement of land units into various categories based on the properties of the land or its suitability for some particular purpose.

landforms - The various shapes of the land surface resulting from a variety of actions such as deposition or sedimentation (eskers, lacustrine basins), erosion (gullies, canyons), and earth crust movements (mountains).

landscape - All features such as fields, hills, forests, and water that distinguish one part of the earth's surface from another part. Usually it is the portion of land or territory that the eye can see in a single view, including all its natural characteristics.

leaching - The removal from the soil of materials in solution. (See also eluviation.)

liquid limit (upper plastic limit, Atterberg limit) - The water content corresponding to an arbitrary limit between the liquid and plastic states of consistence of a soil. The water content at which a pat of soil cut by a groove of standard dimensions will flow together for a distance of 12 mm under the impact of 25 blows in a standard liquid limit apparatus.

lithic layer - Bedrock under the control section of a soil. In Organic soils, bedrock occurring within a depth of between 10 cm and 160 cm from the surface, while in mineral soils it occurs between 10 and 100 cm of the surface.

loamy - Intermediate in texture and properties between fine-textured and coarse-textured soils. It includes all textural classes having "loam" or "loamy" as a part of the class name, such as clay loam or loamy sand.

Luvisolic - An order of soils that have eluvial (Ae) horizons, and illuvial (Bt) horizons in which clay is the main accumulation product. The soils developed under forest or forest-grassland transition in a moderate to cool climate.

map, soil - A map showing the distribution of soil mapping units related to the prominent physical and cultural features of the earth's surface.

mapping unit, soil - Any delineated area shown on a soil map that is identified by a letter, symbol or number. A mapping unit may be a soil unit, a miscellaneous land type, or a complex of soil units.

medium texture - Intermediate between fine-textured and coarse-textured soils. It includes the following textural classes: very fine sandy loam, loam, silt loam, and silt.

mesic layer - A layer of organic material at a stage of decomposition between that of the fibric and humic layers.

metamorphic rock - Rock derived from pre-existing rocks, but differing from them in physical, chemical, and mineralogical properties as a result of natural geological processes, principally heat and pressure, originating within the earth. The pre-existing rocks may have been igneous, sedimentary, or another form of metamorphic rock.

GLOSSARY (CONTINUED)

milliequivalent (meq) - One thousandth of the weight of clay or organic colloid that has a combining power equal to 1 gram-atomic weight of hydrogen. The atomic or formula weight divided by valence/1000.

mineral soils - A soil consisting predominantly of, and having its properties determined predominantly by, mineral matter. It contains less than 17% organic carbon except that an organic surface layer if present may be up to 40 cm thick.

miscellaneous land type - A mapping unit for areas of land that have little or no natural soil.

moderately coarse texture - Consisting predominantly of coarse-textured particles. In soil textural classification, it includes all the sandy loams exept very fine sandy loam.

moderately fine texture - Consisting predominantly of intermediate-sized soil particles with or without small amounts of fine or coarse particles. In soil textural classification, it includes clay loam, sandy clay loam, and silty clay loam.

moraine (glacial till) - The materials transported beneath, beside, on, within and in front of a glacier; deposited directly from the glacier and usually not modified by any intermediate agent.

morphology, soil - (I) The physical constitution, particularly the structural properties, of a soil profile and exhibited by the kinds, thickness, and arrangement of the horizons in the profile, and by the texture, structure, consistence, and porosity of each horizon. (II) The structural characteristics of the soil or any of its parts.

mottles - Spots or streaks, apparent in soil matrix. Colours are usually yellow, red, or orange. They are described in terms of abundance (few, common, many), size (fine, medium, coarse) and contrast (faint, distinct, prominent). Mottling in soils indicates poor aeration and lack of good drainage.

mottling - Formation of presence of mottles in the soil.

Munsell colour system - A colour designation system specifying the relative degrees of the three simple variables of colour: hue, value, and chroma.

Order, soil - The highest category in the Canadian system of soil classification. All the soils of Canada have been divided into nine orders: Chernozemic, Solonetzic, Luvisolic, Podzolic, Brunisolic, Regosolic, Gleysolic, Organic, and Cryosolic. All the soils within an order have one or more characteristics in common.

Organic - An order of soils that have developed dominantly from organic deposits. The majority of Organic soils are saturated for most of the year, unless artificially drained, but some of them are not usually saturated for more than a few days. They contain 17% or more organic carbon.

GLOSSARY (CONTINUED)

organic matter, soil - The organic fraction of the soil; including plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesized by the soil population.

outwash, glacial - Sediments washed out by flowing water beyond a glacier and laid down in thin forest beds as stratified drift. Particle size may range from boulders to silt.

parent material - The unaltered or essentially unaltered mineral or organic material from which the soil profile develops by pedogenic processes.

peat - Unconsolidated soil material consisting largely of undecomposed, or only slightly decomposed, organic matter.

ped - A unit of soil structure such as a prism, block, or granule, which is formed by natural processes, in contrast with a clod, which is formed artificially.

pedogenic - Of or referring to the genesis (formation and development) of soil; used mainly when discussing the kind, strength and distribution of soil horizons in a soil profile.

pedology - Those aspects of soil science dealing with the origin, morphology, genesis, distribution, mapping, and taxonomy of soils, and classification in terms of their use.

perched water table - A water table due to the "perching" of water on a relatively impermeable layer at some depth within the soil. The soil within or below the impermeable layer is not saturated with water.

percolation (of soil water) - The downward movement of water through soil.

permeability, soil - The ease with which gases and liquids penetrate or pass through a bulk mass of soil or a layer of soil. Because different soil horizons vary in permeability, the specific horizon should be designated.

perviousness - The potential of a soil to transmit water internally, as inferred from soil characteristics.

pH, soil - The intensity of acidity or alkalinity, expressed as the logarithm of the reciprocal of the H^+ ion concentration. pH 7 is neutral, lower values indicate acidity and higher values alkalinity.

phase, soil - A subdivision of a soil type of other unit of classification having characteristics that affect the use and management of the soil, but that do not vary sufficently to differentiate it as a separate type.

plastic limit (Atterberg limit) - (I) The water content corresponding to an arbitrary limit between the plastic and semi-solid states of consistency of a soil. (II) The water content at which a soil will just begin to crumble when rolled into a thread approximately 3 mm in diameter.

GLOSSARY (CONTINUED)

plasticity index - The numerical difference betwen the liquid and the plastic limit. The plasticity index gives the range of moisture contents within which a soil exhibits plastic properties.

platy - Consisting of soil aggregates that have developed predominantly along the horizontal axes; laminated; flaky.

pore space - The total space not occupied by soil particles in a bulk volume of soil.

profile, soil - A verticle section of the soil through all its horizons and extending into the parent material.

reaction, soil - The degree of acidity or alkalinity of a soil, which is usually expressed as a pH value.

Regosolic - An order of soils having no horizon development or development of the A and B horizons insufficient to meet the requirements of the other soil orders.

relief - The difference in elevations or irregularities of the land surface when considered collectively.

runoff - The portion of the total precipitation on an area that flows away through stream channels. Surface runoff does not enter the soil. Groundwater runoff or seepage flow from groundwater enters the soil before reaching the stream.

saline - A nonalkali soil that contains enough soluble salts to interfere with the growth of most crop plants. The conductivity of the saturation extract is greater than 4 mS/cm, the exchangeable-sodium percentage is less than 15, and the pH is usually less than 8.5.

sand - a soil particle between 0.05 and 2.0 mm in diameter. The textural class name for any soil containing 87% or more of sand and not more than 10% of clay.

scarp - A steep, precipitous slope of some extent along the margin of a plateau, mesa, terrace, or bench.

sedimentary rock - A rock formed from materials deposited from suspension or precipitated from solution and usually more or less consolidated. The principal sedimentary rocks are sandstones, shales, limestones, and conglomerates.

seepage - (I) The escape of water downward through the soil. (II) The emergence of water from the soil along an extensive line of surface in contrast to a spring where the water emerges from a local spot.

series, soil - The second category in the Canadian system of soil classification. This is the basic unit of soil classification, consisting of soils which are essentially alike in all major profile characteristics except the texture of the surface.

GLOSSARY (CONTINUED)

silt - Soil mineral particles ranging between 0.05 and 0.002 mm in equivalent diameter. Soils of the silt textural class contain 80% silt and less than 12% clay.

soil - The unconsolidated mineral or organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. Soil has been subjected to and influenced by genetic and environmental factors of: parent material, climate (including moisture and temperature effect), macro and micro organisms, and topography, all acting over a period of time.

soil forming factors - The variable, usually interrelated natural agencies that are responsible for the formation of soil. The factors are: parent material, climate, organisms, relief, and time.

soil texture - The relative proportions of the various soil separates in a soil as described by the classes of soil texture. The names of textural soil classes may be modified by adding suitable adjectives when coarse fragments are present in substantial amounts.

solum - The upper horizons of a soil in which the parent material has been modified and within which most plant roots are confined. It consists usually of A and B horizons.

stones - Rock fragments 25 cm in diameter if rounded, and 38 cm along the greater axis if flat.

stratified materials - Unconsolidated gravels, sand, silt and clay arranged in strata or layers.

structure, soil - The combination or arrangement of primary soil particles into secondary particles, units, or peds. The peds are characterized and classified on the basis of size, shape, and degrees of distinctness into classes, types and grades.

subgroup, soil - A category in the Canadian system of soil classification. These are subdivisions of the soil great groups.

subsoil - A general term for the layer of soil (or surficial geologic deposit) which, in the context of this report, underlies the surface and subsurface soil layers. It begins about 50 cm below the surface and continues downward for about 75 to 100 cm.

subsurface soil - A general term used in this report for the approximately 20 to 30 cm thick layer of soil underlying the surface soil.

surface soil - The uppermost part of the soil that is ordinarily moved in tillage, or its equivalent in uncultivated soils. In this report if refers to the upper 15 to 20 cm of the soil.

terrace - Relatively level (0-5% slopes) flat surface which is terminated by an abrupt change in slopes on one or more sides. Often occurs in sequence on valley walls or paired on opposite sides of a valley.

GLOSSARY (CONTINUED)

terric layer - An unconsolidated mineral substratum underlying organic soil material.

till - See glacial till.

topography - The shape of the ground surface such as hills, mountains or plains. The soil slopes may be smooth or irregular.

type, soil - A unit in the natural system of soil classification; a subdivision of a soil series consisting of or describing soils that are alike in all characteristics including the texture of the A horizon.

Unified soil classification system (engineering) - A classification system based on the identification of soils according to their particle size, gradation, plasticity index and liquid limit. It is employed in schemes to predict soil behavior as an engineering construction material.

value, colour - The relative lightness of colour, which is approximately a function of the square root of the total amount of light.

water holding capacity - The ability of a soil to hold water. The water-holding capacity of sandy soils is usually considered to be low, while that of clayey soils is high.

water table - Elevation at which the pressure in the water is zero with respect to atmospheric pressure.

weathering - The physical and chemical disintegration, alteration and decomposition of rocks and minerals at or near the earth's surface by atmospheric agents.

APPENDIX 1

AVERAGE ANNUAL FROST-FREE PERIOD, AVERAGE DATES OF LAST SPRING AND FIRST FALL FROST, AND AVERAGE ANNUAL GROWING DEGREE DAYS (>5°C) FOR STATIONS IN OR NEAR THE OKANAGAN - SIMILKAMEEN MAP AREA

STATION	ELEVATION (metres)	LATITUDE	LONGITUDE	AVERAGE LAST SPRING FROST	AVERAGE FIRST FALL FROST	AVERAGE ANNUAL FROST-FREE PERIOD	PERIOD OF RECORD (years)	AVERAGE GROWING DEGREE DAYS (>5°C)	TYPE OF NORMAL
Hedley	518	49 21	120 05	5-13	10-03	143	28	2053	3
Joe Rich Creek	875	49 51	119 08	6-30	8-12	42	30	1197	1
Kelowna	354	49 54	119 28	4-30	10-08	160	11	2076	8
Kelowna A.	429	49 58	119 23	5-26	9-20	116	12	1801	8
Kelowna Bowes St.	351	49 53	119 28	5-04	10-08	156	8	2107	8
Kelowna CDA.	485	49 52	119 25	5-08	10-06	150	19	1944	8
Kelowna PCC.	346	49 52	119 29	5-05	10-06	153	12	2040	8
Keremeos	430	49 17	119 47	4-18	10-17	181	29	2424	2
Okanagan Centre	347	50 04	119 27	4-26	10-17	173	29	2040	2
Oliver	305	49 10	119 33	5-11	9-28	139	29	2194	2
Oliver 2	304	49 11	119 33	4-20	10-11	173	16	-	-
Oliver STP.	297	49 11	119 33	4-27	10-08	163	8	2514	2
Osoyoos	331	49 04	119 31	4-18	10-16	180	27	2459	2
Osoyoos West	297	49 02	119 26	4-25	10-11	168	13	2516	8
Peachland	424	49 46	119 45	4-15	10-29	196	7	2179	8
Penticton A.	344	49 28	119 36	5-08	10-04	148	30	2136	1
Summerland CDA	454	49 34	119 39	4-27	10-10	165	30	2196	1
Summerland CDA. EL	346	49 34	119 38	4-29	10-20	173	10	2250	8
Vernon	422	50 15	119 16	4-29	10-04	157	9	2011	8
Vernon	555	50 14	119 17	4-22	10-15	175	9	-	-
Vernon KX.	518	50 17	119 13	5-09	10-02	145	5	-	-
Vernon Coldstream	482	50 14	119 12	5-06	10-07	153	30	1895	2
Vernon South	381	50 15	119 16	5-17	9-25	130	5	-	-
Vernon Southwest	360	50 15	119 19	5-09	9-03	116	8	-	-
Winfield	503	50 02	119 25	4-19	10-13	176	10	2043	8

Source: Environment Canada. Atmospheric Environment Service. 1982. Canadian Climate Normals, Volume 4: Degree Days and Volume 6: Frost, 1951-1980. Downsview, Ontario.

APPENDIX 2

MEAN MONTHLY, TOTAL ANNUAL PRECIPITATION, AND ANNUAL SNOWFALL
FOR SEVERAL STATIONS IN OR NEAR THE OKANAGAN - SIMILKAMEEN MAP AREA

STATION	ELEVATION (m)	PRECIPITATION (mm)												TOTAL ANNUAL PRECIP.	SNOW FALL (cm)	TYPE OF NORMAL
		JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.			
Hedley	518	34.0	16.4	14.8	20.8	31.9	34.8	26.7	31.7	19.5	17.6	24.2	31.4	303.8	82.0	2
Joe Rich Creek	875	60.6	42.3	39.0	37.6	55.9	61.8	39.8	49.7	47.3	38.5	45.5	59.2	577.2	195.5	1
Kelowna	354	37.4	26.3	18.1	15.3	25.2	31.1	23.5	27.5	29.0	24.8	28.9	45.1	332.2	96.9	8
Kelowna A.	429	30.7	21.0	18.6	17.7	28.0	26.9	24.1	30.8	29.3	19.0	24.2	42.1	312.4	103.5	8
Kelowna Bowes St.	351	38.3	24.1	12.0	17.3	26.1	33.6	19.9	28.7	20.4	22.0	33.5	42.1	318.0	80.7	8
Kelowna CDA.	485	36.5	26.5	17.6	18.1	29.4	29.4	20.2	27.9	25.0	23.5	29.1	39.5	322.7	96.7	8
Kelowna Lakeview	427	45.3	25.6	20.6	17.8	27.7	27.2	27.0	25.4	21.5	20.1	32.5	39.5	330.2	121.2	8
Kelowna PCC	346	35.8	20.2	15.4	15.1	20.6	23.9	16.4	26.4	27.5	19.3	23.7	42.9	287.2	87.1	8
Keremeos	430	31.7	17.8	12.4	14.3	20.6	27.1	20.3	22.2	12.8	11.0	20.1	32.0	242.3	64.1	2
Okanagan Centre	347	41.8	26.3	21.9	18.7	26.9	29.3	27.2	34.0	30.4	24.7	32.6	41.7	355.5	80.8	2
Oliver	305	31.5	23.0	19.4	19.5	29.7	25.6	18.1	27.3	17.1	16.9	25.5	37.1	290.7	55.7	2
Oliver STP.	297	39.3	20.3	19.8	19.2	29.2	26.0	20.5	28.3	16.7	16.4	25.1	37.0	297.8	67.8	2
Osoyoos	331	41.2	30.0	22.5	20.0	32.5	30.8	19.3	26.9	18.4	17.3	30.0	46.8	335.7	69.4	2
Osoyoos West	297	33.6	26.7	20.3	20.0	32.6	31.3	18.6	24.7	14.9	15.9	26.6	39.0	304.2	61.0	8
Oyama	396	40.5	25.4	22.4	20.3	34.2	37.4	27.4	35.6	34.5	27.0	32.8	49.3	386.8	91.4	8
Penticton A.	344	32.0	19.8	17.3	21.4	29.1	27.6	21.1	26.5	17.7	15.3	23.9	31.2	282.9	76.0	1
Summerland CDA.	454	35.6	18.8	14.8	19.6	27.5	30.6	22.2	27.4	18.8	17.6	25.4	32.8	291.1	77.7	1
Summerland CDA. EL	346	32.3	17.6	15.1	18.7	26.2	29.0	19.9	28.5	19.5	15.9	21.8	32.0	276.5	68.7	8
Vernon	555	32.8	24.8	20.7	19.2	31.6	33.1	25.6	33.1	27.2	23.8	30.1	45.7	347.7	102.8	8
Vernon Coldstream	482	43.9	30.4	23.0	19.6	34.9	45.9	28.4	36.3	34.3	28.4	34.4	53.1	412.6	121.2	1
Winfield	503	39.8	23.5	17.9	16.4	25.1	26.6	23.9	29.9	35.9	19.5	27.6	46.1	332.2	106.2	8

Source: Environment Canada, Atmospheric Environment Service. 1982. Canadian Normals, Precipitation, 1951-1980 period for British Columbia. Downsview, Ontario.

APPENDIX 3

AVERAGE MONTHLY, MEAN ANNUAL AND MEAN ANNUAL EXTREME TEMPERATURES FOR SEVERAL STATIONS IN OR NEAR THE OKANAGAN - SIMILKAMEEN MAP AREA

STATION	ELEVATION (m)	DEGREES CENTIGRADE													MEAN ANNUAL MAX.	MEAN ANNUAL MIN.	TYPE OF NORMAL
		JAN.	FEB.	MAR.	APRIL	MAY	JUNE	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	ANNUAL			
Hedley	518	-5.3	-0.7	3.4	8.3	13.0	16.7	19.9	19.0	14.6	8.1	1.1	-2.8	7.9	14.2	1.6	2
Joe Rich Creek	875	-7.8	-3.9	-0.8	4.5	9.0	12.3	15.1	14.5	10.5	5.0	-1.4	-5.5	4.3	11.3	-2.7	1
Kelowna	354	-3.3	-0.1	3.3	8.3	13.3	17.2	20.4	19.5	14.3	8.1	2.6	-0.7	8.6	14.1	3.1	8
Kelowna A.	429	-5.1	-1.6	2.3	7.5	12.2	15.9	18.7	17.8	13.1	6.9	1.1	-2.5	7.2	13.8	0.6	8
Kelowna Bowes St.	351	-3.1	0.2	3.7	8.5	13.4	17.4	20.3	19.4	14.4	8.5	2.5	-1.0	8.7	14.0	3.2	8
Kelowna CDA.	485	-4.5	-1.3	2.2	7.6	12.8	16.6	19.9	18.9	14.0	7.5	1.1	-2.5	7.7	13.2	2.2	8
Kelowna Lakeview	427	-3.5	-0.1	3.3	8.6	13.7	17.4	20.7	19.8	14.9	8.9	2.3	-0.9	8.8	13.6	3.8	8
Kelowna PCC	346	-3.4	-0.1	3.2	8.3	13.1	17.0	19.9	19.2	14.2	8.2	2.4	-0.9	8.4	13.9	3.0	8
Keremeos	430	-3.4	1.0	5.0	10.0	14.7	18.2	21.6	20.9	16.4	9.7	2.8	-1.5	9.6	15.0	4.3	2
Okanagan Centre	347	-2.7	0.3	3.2	8.1	12.9	16.9	19.8	19.1	14.6	8.8	2.8	-0.5	8.6	13.8	3.3	2
Oliver	305	-3.6	0.2	4.1	9.4	14.1	17.8	20.7	19.7	14.7	8.4	2.4	-1.4	8.9	15.1	2.6	2
Oliver STP.	297	-2.9	0.9	5.0	10.4	15.0	19.1	22.4	21.3	16.3	9.8	3.1	-0.8	10.0	15.5	4.4	2
Osoyoos	331	-3.4	0.5	4.9	10.2	15.0	18.8	22.0	21.0	16.1	9.7	3.1	-1.0	9.7	14.9	4.6	2
Osoyoos West	297	-3.0	0.7	4.9	10.4	15.3	19.1	22.4	21.3	16.4	9.8	3.3	-0.6	10.0	15.9	4.1	8
Oyama	396	-4.0	-0.7	2.7	7.9	12.3	16.2	19.1	18.2	13.5	7.8	1.8	-1.4	7.8	13.4	2.1	8
Penticton A.	344	-2.7	0.6	3.9	8.6	13.4	17.2	20.3	19.5	14.7	8.7	3.0	-0.4	8.9	14.5	3.2	1
Summerland CDA.	454	-3.4	0.1	3.7	8.7	13.5	17.4	20.9	20.0	15.2	9.0	2.5	-1.1	8.9	13.8	4.0	1
Summerland CDA. EL	346	-2.7	0.7	4.1	8.8	13.7	17.7	20.9	20.4	15.6	9.4	3.2	-0.2	9.3	14.6	4.0	8
Vernon	555	-4.8	-1.1	2.5	8.0	12.8	16.8	20.0	19.3	14.2	7.9	1.1	-2.3	7.9	12.6	3.1	8
Vernon Coldstream	482	-6.0	-2.1	2.1	7.9	12.6	16.3	19.1	18.4	13.7	7.4	0.7	-3.4	7.2	12.7	1.8	1
Winfield	503	-4.0	-0.8	3.0	8.5	13.3	17.0	20.1	19.1	14.2	8.1	1.7	-1.7	8.2	13.0	3.4	8

Source: Environment Canada, Atmospheric Environment Service. 1982. Canadian Normals, Temperature, 1951-1980 period for British Columbia. Downsview, Ontario.